

RECORD

52

1887
P
100
39420/- 39650

Ex - photo for this book

58-3 4 5A-13

52

Index

58-3	..... (1st ed.)
58-4	..... (2nd ed.)
58-5	..... (3rd ed.)
58-6	..... (4th ed.)
58-7	..... (5th ed.)
58-8	..... (6th ed.)
58-9	..... (7th ed.)
58-10	..... (8th ed.)
58-11	..... (9th ed.)
58-12	..... (10th ed.)
58-13	..... (11th ed.)
58-14	..... (12th ed.)
58-15	..... (13th ed.)
58-16	..... (14th ed.)
58-17	..... (15th ed.)
58-18	..... (16th ed.)
58-19	..... (17th ed.)
58-20	..... (18th ed.)
58-21	..... (19th ed.)
58-22	..... (20th ed.)
58-23	..... (21st ed.)
58-24	..... (22nd ed.)
58-25	..... (23rd ed.)
58-26	..... (24th ed.)
58-27	..... (25th ed.)
58-28	..... (26th ed.)
58-29	..... (27th ed.)
58-30	..... (28th ed.)
58-31	..... (29th ed.)
58-32	..... (30th ed.)
58-33	..... (31st ed.)
58-34	..... (32nd ed.)
58-35	..... (33rd ed.)
58-36	..... (34th ed.)
58-37	..... (35th ed.)
58-38	..... (36th ed.)
58-39	..... (37th ed.)
58-40	..... (38th ed.)
58-41	..... (39th ed.)
58-42	..... (40th ed.)
58-43	..... (41st ed.)
58-44	..... (42nd ed.)
58-45	..... (43rd ed.)
58-46	..... (44th ed.)
58-47	..... (45th ed.)
58-48	..... (46th ed.)
58-49	..... (47th ed.)
58-50	..... (48th ed.)
58-51	..... (49th ed.)
58-52	..... (50th ed.)
58-53	..... (51st ed.)
58-54	..... (52nd ed.)
58-55	..... (53rd ed.)
58-56	..... (54th ed.)
58-57	..... (55th ed.)
58-58	..... (56th ed.)
58-59	..... (57th ed.)
58-60	..... (58th ed.)
58-61	..... (59th ed.)
58-62	..... (60th ed.)
58-63	..... (61st ed.)
58-64	..... (62nd ed.)
58-65	..... (63rd ed.)
58-66	..... (64th ed.)
58-67	..... (65th ed.)
58-68	..... (66th ed.)
58-69	..... (67th ed.)
58-70	..... (68th ed.)
58-71	..... (69th ed.)
58-72	..... (70th ed.)
58-73	..... (71st ed.)
58-74	..... (72nd ed.)
58-75	..... (73rd ed.)
58-76	..... (74th ed.)
58-77	..... (75th ed.)
58-78	..... (76th ed.)
58-79	..... (77th ed.)
58-80	..... (78th ed.)
58-81	..... (79th ed.)
58-82	..... (80th ed.)
58-83	..... (81st ed.)
58-84	..... (82nd ed.)
58-85	..... (83rd ed.)
58-86	..... (84th ed.)
58-87	..... (85th ed.)
58-88	..... (86th ed.)
58-89	..... (87th ed.)
58-90	..... (88th ed.)
58-91	..... (89th ed.)
58-92	..... (90th ed.)
58-93	..... (91st ed.)
58-94	..... (92nd ed.)
58-95	..... (93rd ed.)
58-96	..... (94th ed.)
58-97	..... (95th ed.)
58-98	..... (96th ed.)
58-99	..... (97th ed.)
58-100	..... (98th ed.)
58-101	..... (99th ed.)
58-102	..... (100th ed.)

Collection and Field Note Book

No. 52

(April 24, 1958 - Oct. 19, 1958)

(39420 --- 39650)

	Pages
<u>Marshall Islands</u>	
Kwajalein.....	1-3
Specimen collected(39420).....	2-3
" " (39487-39501).....	92-95
Namu (from air).....	86-91
	2
Ailinglaplap.....	3
Jaluit (from air).....	4
Jabor I.....	4-8
Jaluit I.....	8-9
Specimen collected (39421)	
Mejatto.....	10-25
Specimen collected (39422-39432)	24-25
Elizabeth (Mejurirek).....	26-37
Specimen collected (39433-39454)	32-36
Jabor.....	36-44
Specimens collected(39455-39460)	36-37
Pingelap.....	45-52
Specimens collected(39479-39485)	80-81
" " (39461-39467)	50-51
Jabor.....	52-55
Specimens collected(39468-39478a)...	52-55
Ribom.....	56-67
Imruj.....	68-73
Lejrok.....	74-77
Mejatito.....	78-79
Sydneytown.....	82-83
Jaluit to Majuro Flight.....	84-85

Majuro.....	92-93
Specimen collected (39486)	92-93
<u>Virginia</u>	
Timberlake (Fairfax Co.)Spec.39523-39529)	112-113
Great Falls.....	98-99, 116
	102-105
Specimens collected(39502-39503)....	104-105
	136--137
Old Fort south of Centreville	104-106
Specimens collected(39504-39518)....	106-111
Shenandoah Nat. Pk-Skyline Dr.(39633-41).	176-182
Shenandoah National Park (Fairfax Co.)	110-111
Specimens collected(39518-39522)....	110-111
Skyland	138-141
Specimens collected(39582-39591)..	138-141
Little Stony Mt.	140-149
Specimens collected(39592-98)....	140-141
Little Stony Man Trail	116-117
Specimens collected(39530-39532)	116-117
Elizabeth Furnace (Shenandoah Co.)	114-115
Shenandoah National Park	120-133
Specimens collected(39534-39581)	120-121
	126-133
Skyline Drive	148-149
Specimens (39615-39621)	148-149
Upper Rapidan Fire Road(Big Mdw)	144-145
Specimens (39599-39609)	144-145
South River Cemetery	146-147
Specimens (39610-39614)	146-147
<u>Maryland</u> , from train window Perryville,	
Aberdeen.....	100
Washington, D. C....Specimen 39533..39650	134-135, 186-187
New Jersey.....	150-152
Pennsylvania.....	152-159
Ohio.....	159
Indiana...Spec.39623-39625).p.164-165..	160-165
Canada.....	166-171
New York..Spec. 39630..(Ulster Co.)....	172-173
Virginia (Fairfax Co.)Sp. 39631-32)....	172-173
West Virginia.....	184-185
Specimens collected (39642-39649)	

F. R. Fosberg Field notes 52
 begin with # 39420
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 Specimens collected (39430-39439) ...
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 Specimens collected (39460-39469) ...
 Specimens collected (39470-39479) ...
 Specimens collected (39480-39489) ...
 Specimens collected (39490-39499) ...
 Specimens collected (39500-39509) ...
 Specimens collected (39510-39519) ...
 Specimens collected (39520-39529) ...
 Specimens collected (39530-39539) ...
 Specimens collected (39540-39549) ...
 Specimens collected (39550-39559) ...
 Specimens collected (39560-39569) ...
 Specimens collected (39570-39579) ...
 Specimens collected (39580-39589) ...
 Specimens collected (39590-39599) ...
 Specimens collected (39600-39609) ...
 Specimens collected (39610-39619) ...
 Specimens collected (39620-39629) ...
 Specimens collected (39630-39639) ...
 Specimens collected (39640-39649) ...
 Specimens collected (39650-39659) ...
 Specimens collected (39660-39669) ...
 Specimens collected (39670-39679) ...
 Specimens collected (39680-39689) ...
 Specimens collected (39690-39699) ...
 Specimens collected (39700-39709) ...
 Specimens collected (39710-39719) ...
 Specimens collected (39720-39729) ...
 Specimens collected (39730-39739) ...
 Specimens collected (39740-39749) ...
 Specimens collected (39750-39759) ...
 Specimens collected (39760-39769) ...
 Specimens collected (39770-39779) ...
 Specimens collected (39780-39789) ...
 Specimens collected (39790-39799) ...
 Specimens collected (39800-39809) ...
 Specimens collected (39810-39819) ...
 Specimens collected (39820-39829) ...
 Specimens collected (39830-39839) ...
 Specimens collected (39840-39849) ...
 Specimens collected (39850-39859) ...
 Specimens collected (39860-39869) ...
 Specimens collected (39870-39879) ...
 Specimens collected (39880-39889) ...
 Specimens collected (39890-39899) ...
 Specimens collected (39900-39909) ...
 Specimens collected (39910-39919) ...
 Specimens collected (39920-39929) ...
 Specimens collected (39930-39939) ...
 Specimens collected (39940-39949) ...
 Specimens collected (39950-39959) ...
 Specimens collected (39960-39969) ...
 Specimens collected (39970-39979) ...
 Specimens collected (39980-39989) ...
 Specimens collected (39990-39999) ...

Box - photos for this book
58-3 to 52-13

F. R. Fosberg Field Notes 52
began with # 39420
and with 39650



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A BOORUM & PEASE PRODUCT

1958 Marshall Is.

1

April 24 - Kwajalein I.

Rained last night,
heavy wind & clouds, rough
sea at 8 a.m.

Trentepohlia very common
on *Tournefortia* trees on
windward side, some seen
on coconut.

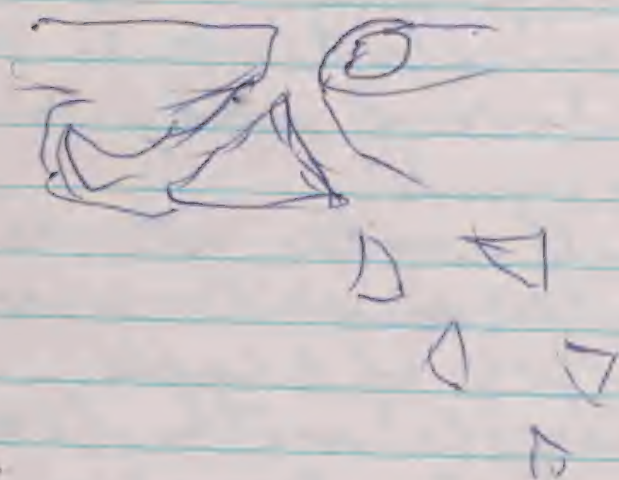
Small water striders (*Halovelia*)
collected ~~a~~ under coral boulder
near top of beach.

Scaevola with leaves
much thickened and badly
distorted by salt.

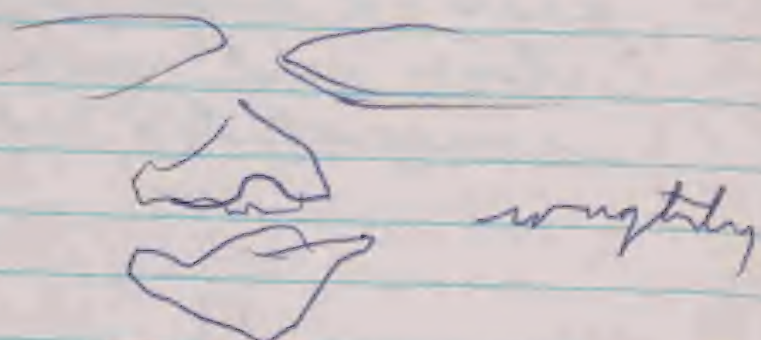
Water striders of 2 sorts, one tiny
black one, one large blue one,
around high tide mark, under
stones and more commonly in
accumulated tufts of *Jarvisia*, etc.

1958 Marshall Is.

Apr. 24 Namu Atoll from
air. (photos 8-10 on Roll 1 b+w)
Narrow pass on west
side, with an arrangement
such as this.



Another, more to south,
with two ~~islets~~ reefs
in entrance



Good native vegetation
on 3 islets, esp. the
two on the east reef. Wind
grooving very conspicuous
on seaward sides. Some coconuts.

Many small bars on
reef. All held by beach-rock
or fragments of reef rock.

Apr. 24. - Kwajalein Islet. Kwajalein Atoll
Trentepohlia
common on bar of *Tournefortia*

39420

2

Apr. 24 - Ailinglaplap Atoll ^{from air}
No signs of typhoon damage.
Two passes on west side
with long spits or reefs
running inward from
them on both sides.

On north west islet,
especially, there are
patches of forest, surrounded
by coconuts. Much of the
forest a pale yellow-green.
(Photos of Ailinglaplap
from one with curious
remnants of platform on
lagoon side.)

Dull orange color.
and Coconut.

Apr. 24 Jaluit from air
went ~~up~~ along east side
at 300' alt.

Islets vary much in
extent of damage. All
have some coconut trees
standing, some have many
more trees standing at north end.

Many coconut trees down
on all islets, all of these
or almost all, on s.e. side
fell toward lagoon, all
along seaward side of
these islets a great amount
of fresh light colored coral
debris is deposited.

Much root mat of coconuts
left toward lagoon side.

On southeast side
islets, ~~are~~ narrow,
very little left on them.

Apr. 24 - Jabor Islet -
Some trees standing,
many knocked over
or broken off.

On the large part of the
islet among the buildings
the situation is very
confused, with scouring
and deposition in a
disorderly mess.

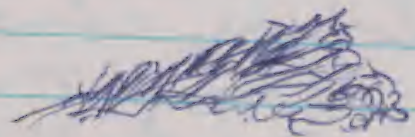
Several *Calophyllum*
trees still standing,
at least one *Terminalia*
standing but one very
large one uprooted.

Casuarinas mostly
standing. Some *Pandanus*
standing, many knocked
down, uprooted, or broken
off. All standing trees
except *Pandanus* are
killed back from the tips
to varied distances; many
or most branches broken
off.

Pod of *Fimbristylis cymosa*
apparently unharmed
in places, also *Cyperus* sp.
Phyllanthus amarus
possibly post-typhoon.
Considerable growth of
Crotalaria, fruiting.

On narrow part of island toward Sydney Pier most of the loose material has been removed. ~~It~~ apparently deposited on the outer reef flat. ~~For~~ the surface of the consolidated platform is irregular but not too much so. The outer edge of this is very discolored by algae and cut into an erosion ramp. The white part was more or less level but if anything slopes a little toward the lagoon. On the lagoon side is discolored unconsolidated material with pinkish or purplish silt in interstices.

The reef flat is narrow here, perhaps not more than 100 m. wide. On it has been deposited, by the typhoon, a long boulder or shingle ridge, mostly of large slabs of coral, imbricated upward from the ocean side.



up to 2.5 m. above the reef flat said to have been generally of this height and nearer the reef margin after the typhoon.

(no!)

but to have been getting lower and nearer the ~~off~~ shore. There seems little doubt that this was ~~was~~ entirely constructed by the storm of the material removed from the islet, as there is no loose freshly deposited material elsewhere, yet the consolidated platform has undoubtedly been cleared of loose material. This loose material has had most of the smaller sizes removed and most of what remains is of a single kind of coral (sample). That this is not freshly torn from the reef is shown by the fact that the pieces are somewhat wave worn.

Here, on the lagoon side are the remains of a Pemphis forest. Many of the trees are knocked down, always falling away from the lagoon. Many are also standing or partly tipped. All are dead distally, at least. Many are sending out small leafy twigs from the trunks. These leaves

taste more saline than is usual for this species, as well as being astringent. Pandanus, on this narrow section, is in very bad condition, mostly dead, whether tipped over, broken off above the roots, or standing.

Tournefortia is rare here, but very heavily sending out new branches from the trunks. Cordia is somewhat beaten down but is very abundantly flowering and fruiting; is very local.

Ipomoea pes-caprae and Wedelia biflora form mats locally, do not seem to have been inconvenienced by the storm. Scaevola is mostly dead but some sticks are sending ~~out~~ out new leafy branches. Occasional patches of Lepturus seen, but rare.

April 24 - Jaluit I. between Sydney town and Jalor.
Cordia subcordata Lam.
very local around old construction sites.

Birds seen include several common noddies, one whimbrel, one turnstone, a number of wandering tattlers, possibly one golden plover, and, according to Herold Wiens, 6-8 reef herons. I saw one white one from the air, the rest are probably correctly identified. They were on the large oil tanks at Sydney town. A large flock of birds, very probably shearwaters, fished offshore most of the afternoon. They flew very strongly and gracefully.

Bits of iron, spikes, etc. are scattered on the old platform surface, seem to be cemented in - need further investigation, as McKee & Gressitt think they are included in the rock.

Tops of trees killed by typhoon, lower branches very healthy; flowers vermilion.

Apr. 25 Jabra to Mejatto ^{2 noddies flying}

Small island inside pass - many low trees still standing but badly beaten. A few - ~~14~~? coconut trees still standing. A number of Pandanus still standing, some with tufts of leaves.

Next islet - about 18 coconut trees, many Pandanus and other things but mostly defoliated.

Next islet - small one - 4 coconuts.

After this we are too far out for observation till we reach Jimij Islet, which ~~seems~~ seems much less affected by the storm than others. Many hundreds of coconut trees standing as well as a green understory of bushes, young coconuts, Pandanus etc. but too far away for good observation.

Jimij islet between this and Imuj has 6 coconuts, one other tree standing, some low bush. Beach material piled up around islet is white.

Imuj Islet, south end has many coconut trees standing,

less toward center, at center almost none, then more toward north end. Many bare stubs of trees without branches. Some Pandanus with a few tufts of leaves.

One noddy, one fairy tern.

Islet at inner end of passage n. of Imuj has 14 coconut trees standing, considerable low vegetation, incl. some Peronia.

Mejatto Islet - south end has quite a lot of coconuts standing.

North of this they are very sparse. Many more broken off part way up than with tops. Much rubbish on ground. Very few trees in center part show any signs of life. In center some actual gaps in vegetation as much as 50 m wide.

~~2~~ 3 noddies flying in lagoon. They are rather common on land. One gray & white phase not known.

A piece of pumice size of man's fist embedded in old coconut root mass, surrounded by capsule of roots. (photo) (sample)

In a rather sandy open place old mats of *Lepturus* and *Thunus* and a few plants of *Fimbristylis* still in good shape.

On south end in wide part of island coconut and breadfruit trees mostly knocked down (photo) but ground vegetation, mostly *Lepturus* and *Thunus* mats, in very good shape. Also some *Polypodium*, many *Pandanus* seedlings of all ages.

(photo)
(photo)
Large mangrove depression near south end has an enormous amount of vegetable debris, bushes, dead trees, etc accumulated in it. The south half is denuded of large trees, or the few left are dead. Thousands of seedlings up to 1 m. are alive here, but not very healthy.

The north half is in good shape except that a few old taller trees are dead or broken off. Seedlings of all sizes are abundant in the abundant muck.

On south edge are a few tall *Pemphis* trees, with smaller branches gone, numerous tiny new branches coming out all over trunk and main branches. (photo)

This whole depression is a section of reef flat enclosed by a high cobble & boulder ridge, about 3 m. high. The bottom is hard, has holes out of which water pours and into which it is sucked, with a period of about 11 seconds causing a fluctuation of water level.

The beach ridge has fairly large seaweeds, *Pemphis* & *Quettarda*, badly beaten by wind but still leafy and green. Open *Thunus* & *Fimbristylis*.

Area between swamps and lagoon south of ridge has apparently not been swept over by waves. *Thunus*, *Crim*,
6 p. 20

Plants on mangroves

Coccoloba nucifera

Many nuts germinating
Young plants 1-2 m. tall knocked
down

Terminalia catappa

Many stumps with sprouts

Pandanus tectorius

Many large trees broken off,
uprooted, or with most of branches
broken off. Young ones and seedlings
in relatively undisturbed ground
near south end

Tacca leontopetaloides

a few seen with small green leaves
on scored ground

Many healthy, flowering, on
grassy high places and on black
soil covered by thin sand.

Morinda citrifolia - on scored land

seedlings, root sprouts, rare.
On north end around mangrove
swamp and on lagoon side stumps
with clumps of sprouts common.
Some saplings or shrubs.

Barringtonia asiatica

Small grove toward south
end - trees of all sizes, mostly
knocked down, but some
standing with branches
removed, all sending out
sprouts, stumps, stubs,
fallen trees, roots, and
some seedlings.

Thudaea involuta

one small loose new mat
about 3-4 dm. diam.

one old mat but most of
growth new, 5 dm. across, loose.
On south end and along
lagoon side large healthy
mats on uncovered ground.

Lepturus

many well developed seedlings
on south end and along
lagoon side extensive
mats on undisturbed
and sand-covered black soil.

Portulaca Tournefortii argentea

very small seedlings locally.
On south end seedling
abundant. Some old
plants along lagoon
beach ridge sprouting
from defoliated shrubs.

Canavalia microcarpa
^{seasonal} seedling about 12 cm. tall.
 Gressitt saw large plants at north end.

Intsia bijuga
 several sprouts from broken
^{up} ^{down} saplings near south end.

Polypodium scolopendria
 several plants in old
 coconut bases. Clump on
 trunk of fallen breadfruit tree.
 Abundant in undisturbed
 ground on south end and
 along lagoon side.

Wedelia biflora
 seedlings up to 20 cm. long
 common. Some sprouts
 from old stems partly
 buried.

On south end and along
 lagoon large mats, flowering.

Premna obtusifolia
 clump of sprouts from old small
 stump.
 rare along lagoon beach ridge
 near south end, sprouting.

Terminalia samoensis
 dense clump of sprouts 3-4
 arm high from old *Ptychophloeum*
 stump.

Guettarda speciosa
 a few sprouts from old
 stubs & down saplings,
 one old trunk 2 dm. thick
 with abundant sprouts.
 Common on south end and
 along lagoon side, esp. on beach ridge.
Leaerola sericea
 tiny seedlings, cotyledons
 only, occasional on bare
 pebbly material on outer
 beach ridge. Larger
 seedlings in coconut root
 mats.

Large plants on lagoon
 beach ridge of south end.

Asplenium nidus
 One tiny plant in exposed
 place near base of coconut
 stump. Large clump on side
 of fallen large breadfruit tree.
 Common on ground and on
 trees around mangrove swamp
 on south end, also in undisturbed
Artocarpus altilis ^{on sand dune} ground.

Dead standing trees and
 dead fallen trees seen.

One fallen sapling with
 a single green sprout,
 not far from lagoon.

Gressitt noted no seedling (?)
 in large tree sprouting from bare
 tree dead.

Pleroma ruderalis
fairly common in undisturbed
grassy areas on north end (Gerritt)

Physalis angulata
also in grassy areas on north end
(Gerritt)

Eleusine indica
also in grassy area on north end
(Gerritt)

Vigna marina
in sized mats, flowering
on unwashed and more rarely
on sand-covered soil near
south end

Pemphix acedula
In mangrove swamp
and in depression near south
end, also some along lagoon
shore. Sprouting abundantly
along trunk and main branches.

Passiflora grandis - one small
shrub, knocked down but
growing vigorously near
mangrove swamp.

Trumpetia procumbens
seedlings abundant on
unscoured soil and on sand.

some old plants on undisturbed
or sand covered areas.

Nephrolepis acutifolia
Common epiphytic in
mangrove area, but mostly
almost dead or just
beginning to sprout

Bruguiera conjugata
Abundant in large
mangrove swamp, in
part healthy, in part
larger plants dead or
sprouting from base. In
smaller swamps only
seedlings, or a less alive
Does not stand bumpy
by gravel.

Calophyllum inophyllum
Large trees along lagoon
side and some inland
many stood up very
well, others tipped over.
Mostly defoliated but
sprouting.

Pseuderanthemum carthagenicum
+ var. *atropurpureum*
Large plants in center of
island, bent over but
abundantly flowering
see p 23

and beer bottles around
old house ^{in yard} soil of here
North of this is an area
that may have been
covered but not buried by
debris. has mats of *Vagrier*,
Lepturus, *Wedelia*, *Thunbergia*
in flourishing condition.
North of this on lagoon
shore some peculiar deep
scars, very abrupt and
even undercut on land
side, with a new bar on
~~the~~ lagoon side.
As inlet narrows
here water is

(photos)

photo

On narrower part of island a sheet of pebble to cobble size fresh material is spread from seaward to a variable distance inland, stopping abruptly. From here lagoonward is generally a thin layer of sand over a black soil. The sand is several cm thick but the old plants - *Fimbristylis*, *Polygodium*, *Lepturus*, *Thunaea*, *Wedelia*, *Triumfetta*, *Vigna*, are able to persist from before storm. Also some *Morinda*, small Pandanus, a breadfruit sapling, small saplings ^{of coconut}, small coconuts. A very few scattered large coconuts standing. Seedling of *Tournefortia* ^{* *Triumfetta*} very common. This is Arad Atoll soil. Some higher islands of this, covered by dense *Thunaea*, not covered at all by sand. *Tacca* in these areas flowering.

prostate

Mangrove swamp in center of islet next to lagoon separated from it by a beach ridge, filled in with gravel from landward side with an irregularly lobed very abrupt margin.

(photo)

Several fairy terns
two white and one gray
reef heron.

nine ~~Sigatoka~~
~~Thirteen~~ ~~five~~ zones

- 1 Area near outer shore
where much material
has been removed, partly
held by coconut root mats
- 2 Sheet of deposited medium
sized white material
in middle of islet, reaching
lagoon in places.
- 3 Black soil covered by thin sand
- 4 Black soil, grassy, inundated
but not washed off
- 5 Area not inundated, protected
by mangrove swamp.
- 6 Area scoured clean on
lagoon side.
- 7 Unfilled mangrove
depression.
- 8 "Delta" in edges of lagoon
- 9 Rubble tracts on seaward
reef flat.

Old house 19

Plumeria rubra

One small tree at old
house site in area near
mangrove swamp not
inundated - stripped over,
leafless, but flowering.

Vernonia cinerea

A few mature plants seen
on grassy spot not covered
by sand or scoured.

Fimbristylis cymosa

Rare or absent in scoured
areas, common & abundant on
areas where soil is thin by or
not at all covered by sand or
gravel. Resisted scouring.
~~Also~~ also around mangrove
swamp and on lagoon beach
ridge on south end.

Rubble tracts are opposite
scour channels running
from lagoon toward sea.

Sheet of deposited material
carried lagoonward
and dropped, covering
soil surface.

Several blue-tailed skink seen
on lagoon side of south end.

April 25 - Mejatito Islet

- 39422 *Nephrolepis aculeifolia*
 3 common on tree trunks in
 mangrove depression
- 2 23 *Pseuderanthemum canthensis* Seem.
 persisting around former
 house site
- 2 24 *Pseuderanthemum canthensis*
 var. *atropurpureum* (Bull.) Forb.
 (same)
- 2 25 (moss)
 on base of coconut trunk
- 2 26 (moss)
 same
- 2 27 (moss)
 same
- 2 28 (moss)
 on tree trunk in mangrove swamp
- 2 29 (moss)
 same
- 2 30 (moss *hepatic*)
 same
- 2 31 (moss *hepatic*)
 same
- 2 32 (algae)
 same

Rhizomes and roots form
 large masses. branches
 drooping
 abundantly flowering
 after being beaten by typhoon.
 flowers white with crimson
 eye. leaves green
 same - leaves purplish
 flowers crimson, dotted
 browned by submergence
 in salt water during typhoon.

April 26 - Boat trip to Elizabeth I.
from Jaluit.

Jaluit I. the density of standing palms very low southward to beyond Hydroston and then for a considerable distance there are none. Then about half-way there are a few for a considerable distance, the density gradually increases till in the last $\frac{1}{5}$ there is no appearance, from a distance, of any damage. Asc. Makenzies there is some damage but not much water came over here - to 200-300 ft at most. This section is the part where the reef lies more or less east and west. The sudden increase in greenness is just where the islet bands.

All islets on south reef from Jaluit to Elizabeth and westward have same appearance of little damage, viewed from the lagoon. Elizabeth has thinnest appearance except for the second one west of Jaluit I.

April 26 (Elizabeth)

No water damage on this islet but wind damage severe.

Many trees blown over or snapped off, mostly toward east or somewhat south of east or somewhat north of east.

Ground vegetation scarcely affected except for ^{some} yellowing or browning of leaves.

Breadfruit shows every degree of damage from being completely thrown and killed to some that are not much affected and have $\frac{1}{4}$ - $\frac{1}{3}$ grown fruit.

Most standing breadfruit trees have most of smaller branches removed and small leafy shoots appearing in all parts. Those broken off a few feet above ground have the most luxuriant development of leafy sprouts.

Blue tailed and black
shrike seen.
Small flock of fairy Terns.
A few common noddies over lake.

Plants seen on Elizabeth
Pandanus tectorius
Artocarpus altalis
Calophyllum inophyllum
Lepturus repens
Physalis angulatus
Fimbristylis cynosu
Centella asiatica
Carica papaya
Polypodium scolopendria
Cremum sp.
Tacca leontopetaloides
Morinda citrifolia
Eragrostis amabilis
Nemna obtusifolia
Musa nana
Vigna marina
Eleusine indica
Hymenocallis littoralis
Gomphrena globosa
Marabalis jalapa
Tagetes sp.
Portulaca alaracea
Hernandia sonch
Alocasia macrorhiza
Triumfetta procumbens
Pteris tripartita
Thuarea involuta
Conchocarpus acidula
Bougainvillea conjugata
Cassytha filiformis
Clerodendrum inornatum
Digitaria pruriens - *microbachne*
Plumeria rubra

Citrus aurantifolia
Nerium sp.
Polypodium scolopendria
Hippocrepis peruviana
Anthosoma sagittata
Zephyranthes sp.
Cucurbita sp.
Canna sp.
Leucaena glauca?
Nephrolepis acutifolia
Nephrolepis hirsutula
Codiaeum variegatum
 * *Cynodon dactylon*
Asplenium nidus
Pseuderanthemum
canuthersii (green)
Guettarda speciosa
Allophylus timorensis
Euphorbia chammissoi
Wedelia biflora
Scaevola sericea
Journefortia argentea
Cordia subcordata
Terminalia samaricensis
Boerhaavia tetrandra
Intsia bijuga
Canavalia macrocarpa
Thuarea involuta
Leucaena glauca
Crinum grandis
Pipturus argenteus
Procris pedunculata
Vittheria elongata
Peperomia

Ernanis cinerea (seen in this only)
Passerinus gambelii (seen in this only)

All tree species suffered considerably from wind. Some of every species observed, except *Calophyllum*, were blown over. All had branches trimmed off and were defoliated.

Small mangrove depression on south side near outer beach - *Pemphis*, *Bruguiera* around edges *Allophylus*, *Entria*, *Pisonia*.

Much debris and dead trees.

Large pond, west end filled with *Enteromorpha* forming blanket over mangrove roots. Patches of *Bruguiera* (photos)

South end of island much more lucid than other parts, not so much damaged by storm - many breadfruit trees not much hurt, but *Pandanus* mostly knocked down. Coconuts less damaged than elsewhere (photos)

Pandanus suffered more than any other species - most of the trees on the island being broken off, largely 2-3 m. above the ground. Most have at least some branches with green leaves.

Around the outer end of the island is an enormous old boulder ridge, very wide, well vegetated. This encloses a small mangrove swamp.

Calophyllum along lagoon beach scarcely affected by storm. On northwest side the leaves are battered, a few trees uprooted.

Trees of a number of kinds, including coconuts, breadfruit, *Calophyllum*, if tipped over but with roots on one side still in ground, continue to grow.

A few trees still have good coconuts on them, including one that was blown down.

1958 ~~to~~ Marshall Is.
 mejuirick
 April 26 - (Elizabeth?)

- 39433 *Portulaca oleracea* L.
 along paths in inhabited area
- 34 *Centella asiatica* (L.) Urb.
 in inhabited area common.
- 35 *Nephrrolepis biserrata* L.
 in open north end on coral rubble
- 36 *Terminalia samoensis* Rech.
 rare on east end
- 37 *Intsia bijuga* (Colebr.) Ktze.
 local on east end
- 38 *Euphorbia charissensis* Boiss.
 common on lagoon beach ridge
- 39 *Canavalia microcarpa* (DC.) Piper
 common on east end of islet

Euph. char. - "beran" or "peran"
 Constipation - ~~drink~~ as infusion
 in either hot or cold water

Centella "manukko"
 constipation - use infusion.

Terminalia "ekung"
 used to cure jaundice and diarrhoea.
 drink infusion made with
 hot water.

fleshy, prostrate, forming
 a loose mat 4-5 dm. across,
 flowers yellow
 forming large dense
 mats, stolons superficial,
 prostrate erect

shrub 1 m. tall, stems

sprouts from old stump
 sterile

stems spreading, somewhat
 ascending, glands
 annular, thick, yellow.
 vine, flowers rose pink.

"marlap" used for medicine,
 for headaches and pains.
 When a person is too thin
 and wants to get fat - squeeze
 the plant in water, pound
 it, then bathe with water.

Portulaca - "marmilyan"
 drink infusion for
 many troubles

Intsia "kubuli"

Pongapo when young people
 want to marry and
 after a while defecate
 worms. They drink water
 in which this has been squeezed.

- 39440 *Nephrolepis hirsutula*
common on ^{coral} rocks and rubble
- 41 *Nephrolepis acutifolia*
common on coconut logs
and stumps (also epiphytic)
- 42 *Pteris pedunculata* (Forst. f.) Wedd.
common on bases of
coconut trees and on coral rubble.
- 43 *Pepernia* ^{phlegmaria DC.}
common on coral rubble
usually shaded.
- 44 *Vittaria* ^{curvata Cav.}
rare, epiphytic
(fungus) on rotting wood
- 46 *Schizopodium commune*
common on dead wood
- 47 (lichen)
on coconut log
- 48 lichen
on coconut log
- 49 (lichen)
on coconut log
- 50 *Enteromorpha*
very abundant in large
mangrove depression
- 51 (blue green)
common in ^{large} mangrove
depression, on sheets of *Enteromorpha*
- 52 (blue green)
common on knees of
Bruguiera in large
mangrove depression

fronds erect

fronds erect, large
masses,stems as much as 0.8 m.
long, curled at tips;
sterile.
fleshy.

fronds pendent

forming sheets, floating
at high tide.

- 39453 (fruits)
 picked up on ground
 54 *Coccoloba nucifera*
 on outer beach ridge

Apr. 27 - Jaber, Jaluit I.
 is ~~an~~ experiment station
 grounds devastated by typhoon

- 55 *Ipomoea littoralis* Bl.
 very local, near beach
 56 *Paspalum vaginatum*
 abundant around saline pond
 57 *Peperomia peltoides* Sw.
 on coral gravel
 58 *Dentella repens* Forst.
 common on coral gravel
 59 *Digitaria pruriens* var. *microbachne*
 local on coral gravel

Apr. 27 - Sydney Town,
 Jaluit I.

- 60 *Ipomoea tubig* (Schlecht.) Don
 common on erabankment
 around old tanks.

tree 14 m. tall, thrown down by
 typhoon (This mutant form
 also known from one tree on
 Majuro, where the nuts are
 known to be sterile).

prostrate, flowers purple,
 darker in center.
 sterile

fleshy

prostrate, flowers white;
 appeared after bananas ^{plant} were
 brought from Kusaie and Ponape.
 decumbent & ascending

extensive vine, flowers
 white, opening in evening.

Apr 27 - Jabor, Jaluit I.

Plants surviving in
old botanical garden and
experiment station

- ca *Stachytarpheta jamaicensis*
 a *Blechnum papuanum*
 a *Euphorbia thymifolia*
 l *Dentella repens*
 l *Cyperus compressus*
 lcp *Leindorffia aurea*
 op *Ficus elastica*
 a *Leucaena glauca*
 c *Vernonia cinerea*
 r *Hedyotis biflora*
 ap *Erithrina ~~sa~~ agata*
 la *Lepturus repens*
 a *Crotalaria ~~maritima~~ ^{incana}*
 c-a *Pilea microphylla*
 a *Physalis angulata*
 a *Phyllanthus amarus*
 c *Portulaca oleracea*
 c-a *Amaranthus viridis*
 c *Euphorbia hirta*
 a *Eleusine indica*
 l *Mounga citrifolia*
 lc *Cyperus kyllingia*
 c-a *Cyperus javanicus*
 c *Vigna marina*
 ap *Leucaena pentandra*
 cp *Pseuderanthemum cantharidifolium*
 cp and var. *atropurpureum*
 lcp *Acalypha amentacea*
 v. *volkesiana*
 cp *Artocarpus altilis*

- ca *Solanum nigrum*
~~*Phyllanthus* ^(wide-leaf)~~
 lc *Euphorbia pinnatifida*
 lp *Cerbera manghas*
 lc *Alocasia macrorrhiza*
 ap *Inocarpus fagiferus*
 c *Eragrostis amabilis*
 c *Centrosema echinatum*
 lc *Lynedrella nodiflora*
 r *Brassia actinophylla*
 lp *Sansevieria roxburghii*
 a *zeylanica* (wide-leaf)
 cp *Rhoeo*
 cp *Terminalia catappa*
 op *Ficus elastica*
 op *Casuarina equisetifolia*
 r *Hippobosca longiflora*
 ap *Cycas circinalis*
 lc *Peperomia pellucida*
 ap *Ficus tinctoria*
 lcp *Colocasia esculenta*
 l *Xanthosoma sagittata*
 l *Couratella argentea*
 lc *Euphorbia frostata*
 ✓ *Musa*
 l *Fremna obtusifolia*
 lc *Ipomoea pes-caprae*
 lc *Eleusine indica*
 a *Carica papaya*
 lc *Gomphrena globosa*
 o *Cinnamomum*
 c *Hymenocallis littoralis*
 lp *Cordyline terminalis*
 c-a *Fimbristylis cymosa*

- 1a *Thuarea involuta*
 cc *Digitaria pruriens*
 c *Pandanus tectorius*
 c-a *Wedelia biflora*
 d *Peromphala acedula*
 cc *Paspalum vaginatum*
 Bragueria conjugata (dead)
 Albizia labele (dead)
 sp *Canna sp.*
 st *Asplenium nidus*
 d *Pisonia littoralis*
 d *Clerodendrum inerme*
 st. *Hibiscus esculento*
 Citrus aurantiifolia
 Citrus maxima (dead)
 Citrus sinensis
 Citrus (aurantium?) (dead)
 st *Cassia occidentalis*
 Cucurbita pepo (dead)
 maxima (dead)
 Cucumis sativus (dead)
 Citrullus vulgaris (dead)
 sp *Zephyranthes rosea*
 st p *Agave sisalana*
 st *Cyperus rotundus* L.
 sp *Delonix regia*
 sp *Coccoloba nucifera*

Flock of turnstones around
 small pond
 several fairy terns
 One noddy.

Most of the trees in the
 experiment station are
 battered wrecks, but
 with new shoots coming
 out of trunks. Pandanus
 many of them broken off
 and killed but also
 many with living branches
 remaining. Some of other
 trees, such as *Ficus tinctoria*,
Cerbera, *Terminalia*, *Casuarina*
 are lying down and sprouting.
 Herbaceous plants are
 growing luxuriantly,
 forming a complete ground
 cover. *Crotalaria* is the most
 abundant but *Amaranthus*,
Phyllanthus, *Cyperus javanicus*,
Blechnum, *Physalis*, *Eleusine*,
Solanum are all abundant.
Leucaena glauca very
 abundant on some areas.

Crotalaria was spread from
 small patch over the entire area
 by MacKenzie, present plants,
 flowering and fruiting, are
 subsequent to Typhoon.

Apr 27 Jaluit I. south
of Jaluit to beyond Sydney Is.

(photo) Shingle ridge on outer
reef flat has in most
places become lower and
more rounded than it
was on Apr. 24.

Some fine material
has been moved shoreward.

(photo) On reef flat between this
and shoal are scattered
boulders, but all are
old blackened ones.

(photo) The imbrication of
Acropora slabs is all
with dip seaward, even
down in ridges.

The main problem is
to account for the
amount of rounding
to be seen. The slab like
Acropora is mostly
broken with edges of
beaks rounded off.
The *Porcellipora* is rusty
brown but with the tubercles
broken off. Some lagoon
type *Junonia* scattered in
with material. Occasional
slabs blackened on one
side but greater part of
material that is above
high tide is white.

(photo) Along both seaward
and lagoon side the
conglomerate platform
is being pried off of
a rather smooth, ~~shale~~
old abraded surface.
Sloping gently toward
sea and very gently toward
lagoon. Platform not very porous
but ^{coarse textured}.

In one place on lagoon
side this has evidently
been uncovered recently
as it is not yet case-hardened.

(photo) On lagoon side is a
wide belt, mostly a
consolidated surface, in
places covered by thin gravel,
that is 1 m or so lower
than the general islet surface
and shelves off into the
lagoon. This is all much
discolored by algae and
may be all covered by high
tide. No vegetation on
this except algae. On
slightly higher ground
is *Pemphix*.

(photo) This lower surface
extends in long lobes
or channels into the
islet. Low cliffs at head
of these channels.

Turnstones occasional
in small groups along
seaward reef. A few
tattlers.

One white and one blue
reef heron. Two blue and
one white around old tank
perhaps including same ones.

One establishment around
old tank *Tournefortia*,
Scaevola, *Pandanus*,
Coco, *Wedelia*, *Vigna*
in abundance, the trees
very badly beaten by
storm. *Sporobolus tuba*

One white heron with
a few black flecks.

One noddy. One New
Zealand cuckoo.

South of ^{highway} ~~islet~~ about 200-
250 m. a channel cut
almost through the islet
to a depth of about 2 m. - 2.5 m.
curved, obviously artificial.

This goes into a compact
layer which corresponds
to the abraded surface
mentioned above. On this
are two separate layers
of very coarse porous
but very consolidated
material, each about 1 m. or
a little less thick, uncompressible.

1 April 25 - Pingelap Islet

Large semi-open area
back of village dominated
by *Vigna*.

Some breadfruit and
Pandanus knocked down
by wind - toward south
or slightly east of south.

Farther west in coconut
area many coconut trees
down pointing 55-65° east
of south. Some 20 m. or so.

Many snapped off 1/3-1/2 way
up. Even small trees knocked
down.

A few coconut trees lying
pointing directly south.
These crossed by those
pointing east and north
of east and south of east.

The grasses and *Vigna*
much more luxuriant
here than seen anywhere
else on atoll.

Fallen breadfruit sprouting
luxuriantly. Majority seem to be down
around atoll soil in
interior.

Young *Pandanus* planting
not damaged at all. Large
Pandanus practically all
broken off well above ground,
a few tipped over.

Plants seen

Tremfetta

Cocos

Eleusine

Lepturus

Catharanthus

Pandanus

Calophyllum

Canva

Artocarpus

Euphorbia hirta

Eragrostis amabilis

Asclepias

Hymenocallis

Fimbristylis

Paspalum conjugatum

Alocasia

Morinda

Tacca

Vigna

Aephanium

Polypodium

Phyllanthus

Citrus aurantifolium

Hibiscus tiliaceus

Nephrolepis hirsutula

Pipturus

Pisonia

Cucurbita maxima

Wedelia

Pteris

Flemingia

Thunbergia

Allophylus

Digitaria

Cyperus javanicus

Ipomoea insignis

Cinnamomum

Acalypha amentacea

Polypodium tricochloea

Cenchrus echinatus

Cassytha

Terminalia samoensis

Scaevola

Physalis

Centella

Euphorbia charnissensis

Pisonia

Euphorbia prostrata

Pseuderanthemum cantharum

v. alba purpurea

Lyneisella

Glumaria

Ipomoea littoralis

Guettarda

Cordia

Gynerium

Rhynchospora

Cyperus odoratus

Eleocharis

Colocasia

Pisonia

Ocimum sanctum

A few fairy Terns and
noddies seen flying. Blue
tailed shrikes common.

One golden plover.
Many coconut trees
along lagoon beach blown
down 70° E of N.

Breadfruit grove has
~~many~~ trees standing
but most branches
broken off. Trees under
3 dm diam.

Most of coconut trees
down in part of 9.
pointing east to southeast.
Here are enormous
numbers of seedlings
of *Pipturus* on bare
ground. Dark thryas and
large taro pit near
north end - perhaps 2 acres.
In parts a good stand
of *Cyrtosperma* fruit
plants small, leaves
not over 3-5 dm tall,
yellow. Parts almost
bare, parts taken over
completely by *Schinus*
and *Cyperus*.

Another pit north of
this is larger, has less
Cyrtosperma, much dead
Pandanus a very little
Colocasia no *Schinus*

little *Cyperus*, several
small dead *Bruguiera*

small mangrove
swamp, slender *Bruguiera*
about 10 m. tall, ~~leaves~~
partly surrounded
by dense tangle of
Hibiscus tiliaceus
about 4-5 m. high.
Hibiscus not much
affected. Most of
Bruguiera killed -
not sprouting now
~~and~~ were any seedlings
seen. Said to have
had 1-2 ft. of ~~water~~
before typhoon, now none.
During typhoon lagoon
water came in waist
deep, depositing great
quantities of coconut trash
nuts, husks, leaves, etc.
in edge.

A few of *Bruguiera* have
some leaves near tops.

Moson bird in coconut tree
being attacked by 4 noddies.
Several wandering
tattlers over two turkeys
1 plover seen. Turkeys in
this pit.

April 28 - Punglap Islet
in semi open ground back
of village

39461 *Hemigraphis reptans* (Forst.) T. And
rare

62 *Paspalum conjugatum* Berg.
abundant

~~63 Euphorbia~~

63 *Euphorbia thymifolia* prostrata Ait.
abundant in open
gravel around dwellings

64 *Echinochloa crus-galli* (L.)
abundant in large tars pits

65 *Cyperus odoratus* L.
common

66 *Sclercharis pumila* (L.) L. & S.
common in mud

~~67~~

bottom of lagoon

67 *Thalassia hemprichii* (Ehrh.)
Aschers.

prostrate, ~~flowers~~ ^{corollas} purplish
white, ~~or~~ falling very readily
prostrate ~~at~~ ⁱⁿ ~~abundant~~
with erect fruiting
culms.
prostrate, purple.

forming large masses,
culms ascending, panicle
drooping slightly
loosely clumped.

tufted

Area to west of tank path
recently burned

Grass pond surrounded
by *Purpurea* 50' or more wide,
mangroves mostly alive,
leaves. Pond surrounded by
soft red mud, with white
specks.

April 28 - ^{Jabor}
~~Jabor~~
Jabor

39468 in Inhabited area, flooded by salt water during typhoon 3 1/2 months ago
in old cistern New Zealand Cuckoo seen

1 69 *Casuarina equisetifolia*
planted

7 70 *Euphorbia thymifolia* L.
abundant in paths

4 71 ~~*Nauclea*~~ ^{*Nauclea*} ~~*cordata*~~ *parmentaria* (Forst.) C.E. Sch.
local in old experiment station

3 72 *Blechnum papuense* Bruner
abundant locally

3 73 *Amaranthus viridis* L.
weed

3 74 *Cyperus compressus* L.
weed along paths

4 75 *Solanum nigrum* L.
common weed in

3 76 *Stachytarpheta jamaicensis* (L.) Vahl
common weed

Tree 12 m tall, badly
battered by storm
prostrate, alive green.

branched herb to 0.8 m. tall.

spreading tufts.

branched herb 1 m. tall,
flowers white.

erect herb 0.7 m. tall,
banded; flowers blue violet.

- 39477 *Lynedrella nodiflora* (L.) Gaertn.
common weed
- 78 ~~Sta~~ *Crotalaria incana* Kt.
very abundant
- 78a *Cyperus ~~compressus~~ rotundus* L.
common in paths in village
saw N. 2. bunches around
old experiment station

erect, up to 0.8 m tall,
flowers yellow; no
brown lines.
bulbs deeply buried, leaves
spreading

April 29 - Islet in channel
n of Jalusa - from lagoon
appears to be sand or gravel
with what may be rock
at just above low tide level
in about 3 places on lagoon
side also on north side
along channel. All around
is a high beach above this.

1 Apr. 29 - Bilow Islet

Plant *Canavalia* (seedling)

Pennisetum
Scaevola *Polyptera*

Pisonia

Guettarda

Barringtonia (seedling)

Asplenium

Cocos

Indigo

Wedelia (seedling)

Limnifolia (seedling)

Sporobolus percapitatus (seedling)

Vigna (seedling)

~~*Apocynum venetum*~~

Polypodium scolopendria

Mouroua (seedling)

Vittaria

Nephrolepis acutifolia

Funaria

Pandanus (seedling)

Leptocarpus (seedling)

Leptocarpus

Leptocarpus

Blue-tailed skink abundant

15-20 fringing trees

5-6 noddies (1-2 white capped)

3 large *Pisonia* trees
~~knocked down~~

5 *Pisonia* coconut, *Guettarda*
knocked down, existing
north, also 2 *Tommeipatia*
also *Andromeda*

1 depression in middle
about 1m

High beach ridge, 2.5-3m
on lagoon side.

11 coconuts standing

1 broken off

6 knocked over.

Beach ridge surrounding
rock-bottomed depression on
seaward side was well
vegetated, was pushed
about 3-4m into depression
plants bent down toward
depression, pointing "N" of "S".

Depression crossed by a low
eroded beachrock or shingle
ridge 5m w of N. Lipping 1/2 m

Low sharp ridge, crescent
shape, around S. side.

enclosing a crescent shaped depression about 8 m. wide, filled with trash, outside of vegetated ridge

Scaevola seedlings numerous especially on root masses of *Asplenium*.

Many root-masses of *Asplenium* lying around where torn off of trees, but many times as many more in central depression where they are attached, with fronds growing upward in place. This is dominant vegetation in bottom of depression.

On side of islet toward pass there is a consolidated bedrock just above low tide level, extending with a small high bank of newly worked material. The ridge that extends to this is slightly above the general level, has been newly eroded and is white. The part of this general surface that is enclosed and forms the bottom of the depression is gray and shows little evidence of abrasion.

It has a sparse growth of small *Pomplis*, 1-1.5 m. tall, not damaged by storm. Though several trees along inner side of depression are tipped over and much debris is piled up on this inner ridge.

Pandanus and *Ochrosia* fruits abundant but *Ochrosia* not germinating and *Pandanus* very rarely.

Cordia and *Scaevola* seedlings common, also *Guettarda*, and locally *Morinda*, *Flouya*.

Lepturus a few patches in open places.

Flouya local in one opening.

Scaevola abundant especially on beach ridges. *Guettarda* and *Portia* somewhat less so. *Pisonia* everywhere but sparse.

Polypodium common in interior.

Nephrolepis mostly dead but some sprouting.

Island has two horns
projecting Sago-mward,
the south one at least,
from a storm. It has
a blue reef here.

put in Kungong

plants

Antiaris arborescens

Morinda

Chytranthus cernuus

Polypodium

Musa sapientum

Cyperus zanzibaricus

Portulaca oleracea

Zephryanthus roseus

Euphorbia hirta

Lepturus repens

Kalanchoe pinnata

Hedera biflora

Pandanus

Amaranthus viridis

Vigna

Hibiscus tiliaceus

Canna

Alocasia

Bougainvillea spectabilis

(abundant, very fragrant)

Pseuderanthemum coccineum

var. *atro-purpureum*

Ambrystylis

Metastachys

Tacca

Trumpetia

Physalis

Plumeria

Cremum sp.

Nephrolepis hirsutula

Calophyllum

Thunbergia

Chenopodium

Pilea

Synedrella

Eragrostis amabilis

Digitaria pruriens var. *microbachne*

Elaeagnus indica

Lipturus

Adenostemma

Allophylus

Asplenium

Nephrolepis acutifolia

Sporobolus

Breugnotia

Intsia

Canavalia microcarpa

Tournefortia

Cassytha

Photos from about #4 on
roll 4 (1-3 are of mangrove from
lagoon)

Coconuts large Morinda
knocked over toward lagoon
Coconut broken off and
lying toward lagoon
All pointing almost
directly south.

One *Calophyllum* ^{lagoon} on beach edge
pointing away from lagoon.

Judging by debris, perhaps
some water came in from
lagoon.

Many breadfruit seedlings
not far from lagoon beach.

Large Breadfruit tree 100m from
lagoon has branches broken
off and thrown toward lagoon,
also mode of break indicates
that force was from seaward.

In interior is a very thick
growth 1-2 m. deep, of
Wedelia, *Vigna*.

Pandanus more or less
broken.

In interior trees thrown
mostly to south, some as much
as 30° east of south, most of them south.
One coconut seen pointing north.
Beyond about the middle of
the island practically all fallen.

tree point 30-50' s of south
and all dead point trees are
knocked down. Most Pandanus
badly broken. *Allophylus*,
large one, down.

From about middle toward
Lagoon on Arad Atoll, soil
from the soil, from the *Thryps*.

Locally, just south of
swamp, are several
coconuts and Pandanus
down, pointing north west
though most are just
the opposite.

Here, in open bare
spot on *Thryps* soil
are abundant *Lipturus*
seedlings.

Swamp - a small
depression with black to
red peaty, firm soil,
water almost fresh, only
a few inches deep. Smell
of the mud soft right
around water, but not deep.
Much coral mixed with
mud, probably washed
in recently.

No mangrove seen but
Hibiscus tiliaceus abundant
not however, mostly forming
as dense tangles as usually.

Top of taller coral dead.
seen. On seaward side
and in more open areas
very chlorotic.
Redward side of
this shows every sign
of inundation with
deposit of much trash.

Seaward of ^{swamp} and
separated from it by
a wide ridge, is a
crescent shaped
arrangement of dense
mangrove depression
with very brackish
water and pure stands
of *Bruguiera* and
Hibiscus. The *Bruguiera*
mostly has the top
dead and especially
so in the most seaward
part.

In the inside of the
crescent is high ground
consolidated. On this
almost all palms are
down, mostly pointing
about 40° east of south, but
some to 70°. The trees are
on top of the soil
which is so much
along the edge of the
depression. Outmost of mangrove
depression separated

Isles ridge.

Highest part of platform inside crescent bare and apparently phosphatic. (sample 5) The black soil is probably Pisonis m., but no Pisonis left. Morinda and Allophylus common. Pipturus seedlings abundant. Coconuts and Pandanus largely knocked down.

Just inside beach ridge and outside mangroves is a pond with only a few mangroves, obviously partly filled in by fresh rubble removed from beach ridge. Many dead uprooted Pandanus and Mangrovia trees in it. All fallen trees pointing directly inland more or less due south.

East half of this pond almost filled in with beach ridge debris and trees & trash.

A road on coast toward many trees are lying pointing 20° W of south. Mangrove up to beach ridge.

little damaged
In indentation on side toward many more trees. Open area back of house covered densely with Nephrolepis lepturus, etc. young coconuts a year or old.

Water sample from well 99' from beach ridge, 130' from low water mark. Appr. 6' deep. Water fresh, st. hard & iron taste. Well cased with oil drum.

Small flock of noddies, both kinds, 2 fairy terns, 1 wandering tattler. Gressitt saw a pigeon.

2 black skink.
Blue tailed skink common.

Apr. 29 - Sunday

Plant

Trumbiclylis

Musa

Lephyranthes rosea

Cucumis sp.

Artocarpus altilis

Eleusine

Leptocarpum

Mirabilis

Cucurbita sp.

Nedelia

Lepturus

Polypodium

Eragrostis amabilis

Centella

Thunbergia

Cenchrus ciliaris

Calophyllum *Kalanchoe*

Cremna

Thunbergia

Nephrolepis acutifolia

Nephrolepis hirsutula

Cordia

Trumpetia

Pandanus

Cassytha

Tacca

Digitaria

Schevola

Ochrosia

Gyettarda

Flamingo

Clorodendrum inornatum

Asplenium

Pipturus (seedlings)

Bruguiera

Barringtonia asiatica

Vigna

Alocasia

Cania

Portulaca oleracea

Tournefortia

Cucurbita maxima

Hedyotis biflora

Pseudonathemum carinatum

var. *atropurpureum*

Hernandia

Calophyllum

at ~~west~~ north^{west} end of
village trees have fallen
25' w of south

1 golden plover
panorama of 6 photos from
w end of 1. Photo of lagoon beach
2 infant from samples, at w end.
Breadfruit seedling
in pen grassy area
at w end.

Locally Thuarea leaves
are brown - salt water?

Phosphate area ^{interior of} is extremely rough and
piled with boulders, as
though there has been extensive
solution and collapse. Perhaps
2 acres. Phosphate must have
been 2-3 ft thick. Some dark brown
mammal-like white weathered pieces of coral ^{embedded}
in the depressions

but with coconut trunks,
pandanus trunks etc.

Still has small red atyid
much sand in bottom.

photos. Few mangroves left,
all large ones dead,
medium ones (4 m) dead at
tops, small ones healthy.

Beach ridge shifted
in W edge of depression,
stopped abruptly, burying

coconut. The trees.

Large Ochrosia ^{tree} knocked
down into mangrove
swamp, pointing 60° or so south.
Large Barringtonia badly
beaten up, between
mangrove and sea.
Many seedlings under it.

In north end of mangrove
depression bottom is rock.
Evidence of solution, channels
and deep undercutting.
Rock stained red-brown.
Water almost as salty as sea.

Deposit of white coral
pebbles & cobbles seaward
of depression very flat
topped. Top about 2 m
above water level at low
water.

This deposit continues
eastward, with an
abrupt lobed margin.
varies from about 30 to 60
m. in width, perhaps
1 m. above general level of
island. Material mostly
rounded, small gravel to
cobble size.

More coconut trees down than
standing here. Quite a

hodgepodge of directions but max 20-30° of S. than any other way. a few just opposite this. Large *Parringtonia* tipped over landward.

Large rubble tracts on seaward reef.

Inland in west third of island the general ground cover is a lawn of *Thunarea* and *Lepturus*, some *Wedelia* badly eaten by insects. Water may have come over here but left few traces, little trash.

In center third much water obviously came over. Enormous piles of trash. Much gravel, etc. Most of coconuts and other trees are down here, mostly pointing from 20° S. of south to 30° E. of south.

Soil has been largely either covered up or scoured away. *Flourensia* very common. Just west of *Talassia* also totally so.

East end has been even more affected, rubble being deposited

almost to the lagoon shore. Most of trees down

East End $\frac{1}{2}$ has not had much water across it but some. Many trees are down mostly pointing south or a little west of south, but a few point north. Max standing trees here than elsewhere on islet.

In slight ~~recession~~ ^{recess} on lagoon side there is a tiny gravel ridge at top of beach, then a cobbles to boulder beach, rather wide, then just exposed at low tide, a wide sand flat, fine sand, rippled surface. (sample 19) This is about 15-20 cm. deep gradually thinning westward till a low tide level pitted rock platform is exposed. Then along shore for about 200-300 m. a $\frac{1}{2}$ m. platform is exposed below a gravel ridge 1.5 m. high.

Apr. 30 - Legro I slat.

Brown booby flying over lagoon, very dark phase.

Hundreds of frigate birds, thousands of noddies, predominantly white-capped, a very few fairy terns, many boobies, mostly brown in various stages.

Coconut ^{cordia, butria} large *Pisonia*, to 1 m. or more diam. down, pointing approximately south.

Many germinated coconuts at top of beach.

Interior of islet was a *Pisonia* grove with a few large *butria*. Now the *butria* and many of the *Pisonia* are down. *Pisonia* sprouting vigorously, *butria* less so. *Pisonia* that are standing have most of branches broken off but are sprouting very vigorously.

around periphery especially on northeast and Tournafortia ^{cordia} and *Terminalia*. *Terminalia* especially common in *leaves*. Many coconut seedlings, several small patches of *Lepturus*. On n.w. extension of islet a pure stand of *Pemphis*, much beaten by typhoon but mostly still alive. Here the substratum is a pitted very dark gray anticlinal platform.

4 crusted terns. When saw a small flock of ternstones.

1 New Zealand cuckoo. *Pisonia* flowering and fruiting vigorously.

Each sand washed inland mixed with humus - probably normal condition before typhoon, as very little phosphate rock found, only a little immediately around base of large tree. Tree hole with water but no crustacea or insects.

1-2 inches of sand over humus on north side.

plants:
Calophyllum (seedling)
Barringtonia ()
Guttarda \longleftrightarrow
Pisonia
Cordia
Terminalia sarawensis
Tournefortia
Asplenium
Intsia
Coco
Pernpithis
Lepturus repens
Canavalia (seedling)
Vigna ()

White-capped noddy
 nesting in abundance,
 about 60 nests with egg or
 downy young visible from
 one position in a fallen
Intsia tree, nests obviously
 built after tree had fallen.
 Mangy areas *Tournefortia*
 and *Pisonia*.

Long curved sand horn
 on east point of island,
 curved like sickle toward
 outer reef. Short one on
 west point, also curved
 same way.
 East of island a

long reef about 100 m. or
 more inside main
 atoll reef, enclosed
 lagoon open at both
 ends.

Large shallow
 area lagoonward of
 islet and stretching
 farther north.

White-capped noddy nest
 very compact, made up
 of *Pisonia* leaves, possibly
 stuck together with excrement
 from appearance, but the
 not investigated. Apparently
 adult birds sitting by
 nests, allowed themselves
 to be handled, possibly
 young not yet flying.

April 30 - Mejat to 9.

Well about 10 m. from sea
3' deep, through rubble
the entire way.
Coconut roots from buried
black soil layers all
the way to bottom, becoming
sparser downward.

None in overlying layers.

Two overlying layers -
top one 7", no forams.

Next layer, with fresh
forams, 2-3"

Last layer black and
filled with roots 6"

Under this rubble with
decomposed forams. 4-7"

the main deposition sheet.

Other well in bottom
of depression, uniformly
dark gray 3-6" water well
bottom. No H₂S odor.

At end - neat small
sharp cobble ridge
along seaward shore,
small depression back of
it 3-5 dm deep then
rise to top of fresh
rubble sheet.

This spreads inward,
little elevation here
except near shore, many
evidence of strong flow inward.

Portulaca oleracea

Portulaca seedling abundant

Medelia

Arundo

Lepturus

Asplenium

Pisona

Tacca

Fimbristylis

Morinda

Glyptostemum

Lipturus

Cinnam

Digitaria

Vigna

Eleusine

Physalis

Albizia

Strobilanthus

Calophyllum

Rubble sheet thin and
inward and ends perhaps
100 m. or more in. but evidence
of flow of sea water continues
inward.

Depression with brackish
water.

Several tall standing
Pisona inward from middle.
Just before these an enormous
deposit of brack.

Breadfruit on inner side
mostly dead ~~some~~ some
nearly so.

Inner side may have
been covered by salt water
but little evidence.

Erosion from lagoon shore
has cut away soil in
places.

rees mostly pointing toward
lagoon but in places confused

Apr 28 Pingelap I.

39479 (fungus)

on bark of dead breadfruit tree

Apr 29 - Kijigong I.

4 80 *Scaevola taccada* (coleb.) Ktze.

edge of forest inside outer beach ridge

2 81 (alga)

open sand inside ~~inner~~ lagoon beach ridge

Lijerom

Apr 29 (Lijerom) I.

2 84a *Leucophanes*

at base of coconut tree

Lijerom

April 30 - (Lijerom) I.

3 82 *Pisonia grandis* R.Br.

dominant tree in vegetation of islet.

1 83 *Pisonia grandis* R.Br.

same.

May 1 - Jabor

Jabor, Jaluit I.

1 84 *Vernonia cinerea* L. Less. var. *parviflora* (Poir.) DC.

very common weed in typhoon-flooded area

1 85 *Ageratum conyzoides* L.

very rare just above beach

small tree

dense cushion, perhaps
whitened by inundation
2 1/2 months earlier by salt water.low tree with massive
trunk, flowers pale green.

same

flowers purple

flower white

May 1 - Hydractinium

Cut across islet cut into a compact layer extending across islet but becoming more rubble seaward. Well consolidated but not case-hardened.

Then a rubble layer, weakly consolidated, can be pulled apart with pick. Top very flat. Judging by algal growth the top corresponds with high tide, layer is about 2.5' thick & somewhat more.

Has interior partly filled with fine material.

Over this is a variable layer of rubble 2-4' thick, to 3.9' at highest point nearer seaward side. This has little or no fine material. It is weakly consolidated at least near cut. Here it shows some flowstone deposition. May be loose away from cut.

Barker points out that this middle layer may be like the sheet deposit on Meialto and could be consolidated because between tides.

width of islet from inner edge of beach rock is 115'

Levels taken with reference to rising tide.

water level	top of bed layer	top of middle layer
0	0.9	2.5
0	0.5-0.8	2.9
0	0.5	2.8
0	0.5	2.8
0	0.5	2.75
0	0.4	2.8
0	0.4	2.74
0	0.35	2.68

Top layer is weakly cemented

January - saw N. Z. cuckoo again.

Very high tide in afternoon - many depressions filled with water which came up through bottoms.

The old Japanese tennis court and one of the garden plots were flooded.

Young coconuts, 4 years or bit more, ~~planted~~ on this garden plot flooded by 6 inches of salt water.

May 2 - Flight from
Jaluit to Majuro

Small bar exposed on reef ^{morning in from}
^{perhaps 17:15} from hydne to my

south at point no
preference in
direction of palm
coconut trees, then
gradually more
point seaward.

but still not all.
At corner of Jaluit I
a white rubble sheet
covers the east side
in to about diameter
of narrow part to
north. Change in
amount of vegetation
damage abrupt. Large
mangrove swamps
not much affected.

Mangroves very scarce
around pond on Elizabeth,
more around pond
on next islet. These
not much affected
by storm.

20 amazing small
islets toward Pigeon
greater than in area
between Elizabeth and
Jaluit I.

A number of "secondary
lagoon" along west side
Also small bar on reef -
some with, some without
beachrock - pink in color
as if made of foram sand.

Along west reef, especially
northward there seem to
be surge channels
both on lagoon and
seaward sides.

On islets north of Mejatto
white rubble sheets cover
seaward $\frac{2}{3}$ - $\frac{3}{4}$ of islets.
Some vegetation remains on
lagoon side.

This pattern to perhaps 5 islets
from north end on east
reef, then much less
damage.

Kwajalein Islet

Plants

- la Cyperus rotundus
 c Lepturus repens
 o Homocidus cephus
 c Heliotropium ovalifolium
 c Judas procumbens
 c Tournefortia argentea
 c Euphorbia thymifolia
 c Cosmos nucifera
 l Crinum procerum
 l Crinum asiaticum
 c Cynodon dactylon
 c Paspalum vaginatum
 l Chrysopsis aciculatus
 l Dactyloctenium aegyptium
 c Phyllanthus amarus
 c Lenchus echinatus
 c Stachytarpheta indica
 c Euphorbia hirta
 c Eragrostis amabilis
 lc Balaia pilosa var. cordata
 c Portulaca oleracea
 o Vernonia cinerea
 l Portulaca sarcochena
 l Euphorbia prostrata
 c Eleusine indica
 c Licanistylus cyneus
 Hibiscus hybridus
 Thespesia peruviana pangeran
 n Ipomoea triloba
 c Paspalum
 n Euphorbia javanica
 c Pluchea odorata

- a Desmodium canum
 n Centella asiatica
 lc Wedelia biflora
 lc Scaevola scabra
 lc Euphorbia heterophylla
 lc Vigna marina
 c Pluchea indica
 l Galipeta alba
 c Pandanus tectorius
 Desmodium canum
 n Moringa oleifera
 o Calophyllum inophyllum
 la Conyza canadensis
 la Cassipoua filiformis
 nl Hibiscus tiliaceus
 l Pluchea populnea
 l Adiantum tiliaceoides?
 o Pseudanthemum antherae
 var. atropurpureum

In old terminal

Alnus incana

Hibiscus ~~var. *incanus*~~

Gardenia jasminoides

Pseudanthus aurantiacus + var.

Tabernaemontana coronata

Codiaeum variegatum

Hibiscus cf. schizopetalus

Alocasia macrorrhiza

Pedicularis thyrsoides

Nerium sp.

Hedyotis sp.

Polyscias scolotheca

Hypocistis litoralis

Philodendron bispinatum

Acalypha wilkesiana

Freziera nivalis

Polyscias trichoclada

Polyscias (crumbled)

Angelonia angustifolia

Cordyline australis

Pentas lanceolata

Senecio elegans

Rhaphis flabelliformis

Agave americana + var.

Yucca filifera + var.

Chylodactylus (scallop-like)

Cydonia cuneata

Phidendrum ? (orange)

Passiflora

Cordyline terminalis

Cathartanthus rostratus

Carissa papaya

Passiflora edulis

Chrysobalanus *cuteracea*

Euphorbia (fleshy spatulate lvs)

Cynobalanus ?

Aracantha excelsa

Phytospermum macanthum ?

Scindapsus aureus

Epipremnum pinnatum ?

Euphorbia pulcherrima

Acalypha hispida

Vitex trifolia

Ravenala madagascariensis

Artocarpus altilis

Anthurium (common)

Asparagus sprengeri

Polyscias guilfoylei

Ficus retusa ~~var. *retusa*~~ *morphology*

Calophyllum inophyllum

Streptocarpus

Bussellia equisetiformis

Dracopis sp.

Roccoloba murifera

Polypodium scolopendria

Scheuchzeria palustris

Solanum sp.

Cordia sebestena

Thespesia ~~var. *sebestena*~~ *yellow*

Cassia alata

Phoradendron sp.

Glinchus *sepioides*

Tabebuia pentaphylla

Acrostichum *gambelii*

Ficus rubiginosa

Euphorbia

Hibiscus tiliaceus

Clerodendrum ~~arborescens~~
Bougainvillea ~~sp.~~
Hibiscus ~~undulatus~~
~~*Myrsine* sp.?~~
Rapanea
Terminalia ~~catappa~~
Aristolochia ~~scabra~~
Quercus ~~speciosa~~
Thespesia ~~populnea~~
Hernandia ~~correa~~
Casipourea ~~spontifolia~~
Spathodea ~~coriacea~~
Hibiscus ~~conchocarpus~~
Leucaena ~~sericea~~
Leucaena ~~rostrata~~
Rhoeo ~~spathulata~~
Achras ~~oppositifolia~~
Pennisetum ~~americanum~~
Citrus ~~sp.~~
Melastoma ~~bicolor~~
Anacardium ~~occidentale~~
Pentstemon ~~sp.~~
Carissa ~~grandiflora~~
Zephyranthes ~~rosea~~
Munroa ~~paniculata~~
Caryophyllus ~~sp.~~
Corydalis ~~sp. very slender, almost leafless~~
Dianthus ~~repens~~
Asplenium ~~nidus~~
Begonia ~~sp.~~
~~*Hedyscymma*~~
Polypodium ~~fruticosa~~
Polypodium ~~caudatum~~ *longifolium*
Allamanda ~~cathartica~~

Peperomia ~~guttata~~
Cissampelos ~~asiatica~~

15 in 1st

May 2 - Delap Islet

Majuro Atoll

3948 *Dentella repens* Forst.abundant around edge
of airstrip

May 4 - Kwajalein Islet

Kwajalein Atoll

✓ 37 grassy ground near airstrip

✓ 37 *Pennisetum trilobum* L.

very local, one patch seen

✓ 88 *Paspalum setaceum* Michx.

common

✓ 89 *Euphorbia glomerata* (Mill.) Wheeler

common locally

✓ 90 *Cyperus polystachyus* Rottb.

local

✓ 91 *Pluchea indica* (L.) Less.

common

✓ 92 *Pluchea odorata* (L.) Less.

common

4 93 *Pluchea*
several plants in small
colony with #39491 and 39492✓ 94 *Euphorbia maculata* L.

one plant seen

✓ 95 *Lespedeza canescens* (Gmel.) Sch. & Th.

very common

May 5 - same

✓ 96 *Dactyloctenium aegyptium* (L.) Richt.

locally common

✓ 97 *Cyperus rotundus* L.

locally common

prostrate, forming mats,
flowers whiteprostrate, flowers
reddish purple
spreading to ascending

erect, arching at apex

ascending to erect.

erect shrub, branched,
4 dm. tall, flowers rose pink.
shrub 6 dm. high,
flowers pinkish gray
prostrate shrub,
much branched, flowers
purpleprostrate, olive green
with spot in flowerculms decumbent, spreading,
slightly ascending

39493 large

✓ 3 99 on Euphorbia prostrata
Digitalis cilianis (Raty) Koll.

✓ occasional

✓ 39490 *Portulaca oleracea* v. *pollin.*

✓ locally common

✓ 41 *Portulaca oleracea* L.
 very common

causing normally
 prostrate stems to grow erect.
 calyx somewhat ascending

prostrate, fleshy, flowers
 yellow

prostrate, fleshy, brownish
 flowers yellow, almost
 1 cm across, stamens 10-17.

May 21 - Great Falls of the
Potomac

Rocks overlooking falls -

- c. *Myosotis virginica*
- c. *Rumex acetosella*
- c. *Hemibara americana*
- c. *Lonicera japonica*
- c. *Campsis radicans*
- Cerastium*
- Laguna*
- Plantago lanceolata*

Open part of park

- Poa annua*
- Anthoxanthum odoratum*
- Betula nigra*
- Platanus occidentalis*
- Toxicodendron tulipifera*
- Taraxacum vulgare*
- Plantago rugellii*
- Stellaria media*
- Galium aparine*
- Parthenocissus quinquefolia*
- Trifolium arvense*

Wooded flats along canal
Stellaria graminea
Galium aparine
Salvia herbacea

Compared with
of *Cerastium*
from *palustris*

(leaves)

- Betula nigra*
- Platanus occidentalis*
- Rhus Toxicodendron*
- Lymnocarpus foetidus*
- Menispermum canadense*

1958

Virginia

May 24 - Great Falls of the
Potomac

Rocks overlooking falls -

c. *Gyrostachys virginica*c. *Rumex acetosella*c. *Hieracium americanum*LAKE MOHONK MOUNTAIN HOUSE
MOHONK LAKE • NEW YORK~~*Trifolium arvense*~~ *Trifolium*

Wooded flats along canal

*Stellaria graminea**Galium aparine**Salvia lyrata**Nepeta hederacea**Phacelia**Phlox divaricata**Stellaria media**Alliaria**Samolus longistylis**Podophyllum peltatum**Lindera benzoin**Parthenocissus quinquefolia* (hairy)*Vernonia officinalis**Crataegus cuneata**Cercis**Asimina**Celtis**Raxinus americana**Stellaria pubera**Galium obtusifolium**Smilax hispida**Carpinus carolinianus**Cornus florida**Betula nigra**Platanus occidentalis**Alnus incana**Lymnocarpus foetidus**Menispermum canadense*



May 21 - Great Falls of the
Potomac

Rocks overlooking falls -

- c *Myosotis virginica*
- c *Rumex acetosella*
- c *Hieracium americanum*
- c *Lonicera japonica*
- c *Campsis radicans*
- Cerastium*
- Lagotis*
- Plantago lanceolata*

Open part of park

- Loa annua*
- Anthoxanthum odoratum*
- Betula nigra*
- Platanus occidentalis*
- Liriodendron tulipifera*
- Trachycarpus vulgare*
- Plantago rugelii*
- Stellaria media*
- Salvia lyrata*
- Parthenocissus quinquefolia*
- Trifolium arvense*

Wooded flats along canal

- Stellaria graminea*
- Galium aparine*
- Salvia lyrata*
- Nepeta hederacea*
- Phacelia*
- Phlox divaricata*
- Stellaria media*
- Alliaria*
- Samolus longistylus*
- Podophyllum peltatum*
- Lindera benzoin*
- Parthenocissus quinquefolia* (hairy)
- Veronica officinalis*
- Crataegus cuneata*
- Cercis*
- Asimina*
- Celtis*
- Raxinus americana*
- Stellaria pubera*
- Galium obtusifolium*
- Smilax hispida*
- Carpinus caroliniana*
- Cornus florida*
- Betula nigra*
- Platanus occidentalis*
- Rhus toxicodendron*
- Lymnocarpus foetidus*
- Menispermum canadense*

May 30 - Between Perryville and Aberdeen, observation from train window.

On west side of the Pennsylvania Railroad in open cultivated gently rolling land are shallow depressions without outlets, with standing water, or if dry with vegetation contrasting with the grain in the surrounding fields. Origin of these and of the surface itself not obvious.

June 21 Great Falls

Salvia lyrata 7. p.
Elephantopus scutellariifolius 7. p.
Allium vineale 7. p.
Celastrus scandens 7. p.
Achillea millefolium fl.
Lysimachia ciliata fl.
Polygonum 7.
~~*Hyssopus virginicus*~~ fl.
Asimina triloba 7.
Penstemon fl.
Galium obtusifolium fl.
Hemerocallis fulva fl.
Rosa carolina fl.
Aster (Sericocephalus) fl.
Viburnum prunifolium 7. p.
Lonicera japonica fl.
Quercus stellata 3 p.
Rhus canadensis 7.
Galium villosum 7.
Cornus 7.
Lepidium virginicum fl.
Ilex verticillata fl.
Viburnum dentatum 7. p.
Scutellaria integrifolia fl.
Scutellaria ovata fl.
Vaccinium stamineum 7. p.
Vaccinium vacillans 7. p.
Silene antirrhina fl.
Triodanis perfoliata fl.
Polygala 7.
Quercus ~~stellata~~ phellos 7.
Parthenocissus quinquefolia fl.

Pantheria spicata (tops of cliffs)
Clematis (Viorna)

Vincetoxicum

Stipa

~~*Desmodium officinale*~~

~~*Hyssopus*~~

Melilotus officinalis

Melilotus albus

Stelea trifoliata

Celtis occidentalis

Dioscorea quaternata

(lvs. green beneath, 3 at lower node)

Staphylea trifoliata

~~*Desmodium*~~ *Ilex decidua*

Cryptotaenia canadensis

Alharia

Circaea quadrangulata

Dodocathron media (int.)

Elymus virginicus

Hypoxis

June 21 - Great Falls of the Potomac
rocky flat above river

39512 *Polygala obtusata* f. ~~obtusata~~ *obtusata* Blake
sandy semi open spots on

03 *Ilex decidua* Walt.
in wooded

June 22 - old Civil War fort on
Union Mill Rd. about 1 mi.
south of Centreville

Flat land covered
by cut-over woods, mostly
deciduous, with scattered
Pinus virginiana and *Juniperus*
virginiana. Trees mostly
about 1 dm. or smaller dbh, but
occasional larger ones
3-4 dm.

Well preserved earthworks of
old fort extend for some distance.
Pinus strobus seedlings planted
in ~~rows~~ rows along fortification, 0.3-
5 ~~feet~~ ground layer

herbs and subshrubs

Vaccinium vacillans

Fraxinus, *Carya* & *Quercus*
seedlings

Opuntia hypericoides
Panicum sp.

Aureolaria laevigata

Galium circaeazans

Hedyotis purpurea

Centella integrifolia

flowers rose pink

arching shrub to 3 m. tall,
several to many stemmed,
recently sending up root sprouts.

Bypassed Fort

There is a nice quiet, pic-
turesque tract of wooded
land, approximately 100
acres, alongside Old Union
Mill road, Route 659, in Fair-
fax County, Va. The location
is about one mile and a half
south of U. S. Route 29-211
and about 21 miles from
Washington.

This site is one of the few
remaining Civil War forts in
the Washington area. Like a
silent sentinel the old forti-
fications meander along from
the north southward across
the wooded landscape and
about 125 feet west of the
Union Mill road. These for-
tifications are well preserved
and are visible from the road.

The Old Union Mill road
formerly extended to the
railroad, which is about three
miles south of the fortifica-
tions. This is believed to
have been one of the most
important fortifications
guarding the Federal City and
adjacent Northern Virginia
territory held by the Union
Army.

The property is available
for purchase as parkland at
this time at less than one-
sixth of the cost per acre
that was approved by the
Board of County Supervisors
for the purchase of the 15-
acre Fort Marcy tract. In
another section of the county.

Observer

forest is now essentially
a story forest -
attained large emergents
mostly *Quercus alba*
and *Carya* spp.
as *Liquidambar*

canopy layer 15-30 m.

gely *Carya* spp.

ne *Quercus alba*

Pinus virginiana

Rosa virginiana

Fraxinus americana

understory 2-6 m. tall

Cornus florida

Cecis canadensis

Cecis canadensis

Quercus alba

4) shrub layer ± 1 m. tall

saplings of above broad-leaved
species.

Prunus sp. (cherry)

June 21 - Great Falls of the Potomac
rocky flat above river

39512 *Polygala obtusata* f. ~~obtusata~~ *obtusata* Blake
sandy semi open spots on

03 *Ilex decidua* Walt.
in wooded

June 22 - old

Union Mill Rd
south of Centerville

Flat land

by cut-over &
deciduous.

Pinus virginiana

virginiana. 7-8

about 1 dm. or 2 m

occasional

3-4 dm.

Well preserved

old but extend f

Pinus strobus

in rows also

5' ~~leaves~~ grass

herbs and

Vaccinium

Fraxinus, seedlings

Opocymon hypericoides

lanatum sp.

Aureolaria laevigata

Galium circaezans

Hedysotis purpurea

Scutellaria integrifolia

at Chevy Chase Club and the
Colonial Club of New York.

Mrs. Grant, the former Cor-
nelia Pendleton, was the grand-
daughter of the late William L.
Marcy, Secretary of State under
President Pierce, and the grand-
niece of the late Senator Pen-
dleton, Republican of Ohio.

She is survived by her hus-
band and of the home address: two
daughters, Mrs. Samuel G.
Bingham of Glendora, Calif.,
and Mrs. Carl Jackson of
Baltimore; five grandchildren
and one great-grandchild.

Services were scheduled at
St. John's Episcopal Church
363 Bancroft place N.W., at
3:30 p.m. today. Burial will be
in Tarrytown, N. Y.

J. W. Pole, Former
U. S. Controller

John W. Pole, 57, English-
born Controller of the Currency
under President Hoover, died
yesterday in a Fairfield (Ill.)
hospital.

He was appointed to the post
from the position of national
bank examiner by President
Hoover shortly after Mr.
Hoover's election. He served in
that post until his resignation
in 1932.

The controller official then
became president of the Fidelity
Investment Association and
is active in the Fidelity Associa-
tion of New York.

Opocymon hypericoides
lanatum sp.

Aureolaria laevigata

Galium circaezans

Hedysotis purpurea

Scutellaria integrifolia

to p. 106

flowers rose pink

arching shrub to 3 m. tall,
several to many stemmed,
apparently sending up root sports.

The forest is now essentially
a three story forest -
1) scattered large emergents
mostly *Quercus alba*
some *Carya* spp.
a few *Liquidambar*

2) open canopy layer 15-20 m.
tall,

Largely *Carya* spp.
some *Quercus alba*

" *Pinus virginiana*

" *Diospyros virginiana*

Fraxinus americana

3) understory 2-6 m. tall

Cornus florida

Cecis canadensis

Acer rubrum

Quercus alba

4) shrub layer ± 1 m. tall

saplings of above broad-leaved
species.

Prunus sp. (cherry)

June 21 - Great Falls of the Potomac
rocky flat above river

39512 *Polygala obtusata* f. ~~obtusata~~ ^{obtusata} Blake
sandy semi open spots on

03 *Ilex decidua* Walt.
in wooded

June 22 - old Civil War fort on
Union Mill Rd. about 1 mi.
south of Centreville

Flat land covered
by cut-over woods, mostly
deciduous, with scattered
Pinus virginiana and *Juniperus*
virginiana. Trees mostly
about 1 dm. or smaller dbh, but
occasional larger ones
3-4 dm.

Well preserved earthworks of
old fort extend for some distance.

Pinus strobus seedlings planted
in rows along fortification, 03 - nearly 100% tall.

5 ~~herb~~ ground layer

herbs and subshrubs

Vaccinium vacillans

Fraxinus, *Carya* + *Quercus*
seedlings

Glycerium hypericoides
Tanacetum sp.

Aureolaria laevigata

Galium circaezans

Hedysotis purpurea

Scutellaria integrifolia

flowers rose pink

arching shrub to 3 m. tall,
several to many stemmed,
apparently sending up root sprouts.

The forest is now essentially
a three story forest -
1) scattered large emergents
mostly *Quercus alba*
some *Carya* spp.
a few *Liquidambar*

2) open canopy layer 15-20 m.
tall,

Largely *Carya* spp.

some *Quercus alba*

" *Pinus virginiana*

" *Rhus typhina* *virginiana*

Fraxinus americana

3) understory 2-6 m. tall

Cornus florida

Cecis ~~canadensis~~ ^{canadensis}

Acer rubrum

Quercus alba

4) shrub layer \pm 1 m. tall

saplings of above broad-leaved
species.

Prunus sp. (cherry)

Parthenocissus quinquefolia
Pantheria spicata
Aster spp. (not in flower)
Rosa carolina
Lysimachia quadrifolia
Lonicera racemosa
Dioscorea quaternata
Rubus sp.
Desmodium spp.
Hypoxis aurea
Prænanthemum sp.
Solidago spp.
Carex stellata ?
Sentellaria ovata

Ditches along the fortification
 in woods with practically
 no aquatic or semi-aquatic
 plants. In one area where
 ditch approaches road
 and is open there is an
 abundant growth of
Carex

Juncus effusus
Scirpus
Juncus sp.
Nuphar advena

June 22 - about 1 mile south of
 Centerville

is rather thin second growth
 39504 *Pantheria spicata*
 occasional

Cunila origanoides
Anemone thalictroides
Lonicera glauca
Lonicera japonica
Vitis spp.
Hieracium venosum
Oxalis
Antennaria plantaginifolia
Potentilla simplex ?
Hedysotis coerules
Carex campestris ?

Beyond here, where
 ditches are on the edge
 of the woods the bottom
 of the one away from the road
 has a thin growth of
 sphagnum but with
 none of the normal
 associated bog plants
 except one tiny colony of
Ludwigia palustris. The
 sphagnum here is well
 established.

mixed woods.

- 39506 *Hedyotis caerulea*
occasional to common
- 2 06 *Carex*
common
- 1 07 *Panicum*
common
- 1 08 *Hedyotis purpurea*
common
- 1 09 *Scutellaria integrifolia*
rare
- 2 10 *Carex*
occasional
- 1 11 *Galium cinereum*
occasional
- same in standing
water in trench of old
fort. in sunny opening.
- 1 12 *Scirpus*
occasional
- 4 13 *Carex louisianica* Bailey
abundant
- 4 14 *Juncus*
large colony
- same - in open pine woods
along road
- 1 15 *Asclepias variegata* L.
rare
- 1 16 *Rosa carolina* L.
common
- 2 17 *Scutellaria integrifolia* v. *integrifolia*
common

culms solitary, to small
tufts.

small tufts, culms slender, erect.

mostly in young fruit,
occasional plants with lavender
flowers blue-lavender,
two white marks on palate of
lower lip.

small tufts of weak incline
culms.

culms solitary, erect;
fruit immature
culms erect, solitary

erect, heads brown

flowers white except
bright purple base of corona
flowers bright pink, fragrant

erect, flowers blue violet
with two white marks on palate
of lower lip.

39213

Scutellaria integrifolia ^{var. *shradantha* Fern.}
occasional but very
local (with common blue
violet form)

June 27 - Big Meadows Picnic Ground
Shenandoah National Park

19 *Botrychium virginianum*
open grassy woodland

June 27 Elk Wallow Picnic ground
Shenandoah National Park
in mixed pine and oak woods

70 *Bromus sterilis* L.
small colony several m.
across.

21 *Hellaria media*
occasional

June 28 Big Meadows Picnic Ground
Shenandoah National Park

27 *Dennstaedtia punctilobula*
common in shade of scrubby
forest on very rocky gentle slope

erect; flowers bright
rose pink, with two
cream white marks on
palate of lower lip.

fertile part of frond
~~sterile~~ forked.

spreading, semi-prostrate.

fronds light green, almost erect.

July 4 - Timberlake,
west of Vienna

- 39523 *Potamogeton diversifolius*
small colony in small pond.
- 24 (grass) *Festuca obtusa*
occasional in wooded bottom-land along stream
- 25 *Athyrium filix-femina*
common in wooded bottom-land along stream.
- 26 *Galium ~~oblongifolium~~ ^{triplex}*
common in wooded bottom-land along stream
- 27 *Panicum*
common on slope of earth dam in full sun
- 28 *Panicum*
on disturbed ground along road in woods, shaded.
- 29 *Carex*
on disturbed ground along road in woods, shaded

July 5 - Woodstock Observatory,
ridge on west boundary
of Fort Valley
granite ridge
covered by mixed
hardwood forest -
Tilia, *Quercus rubra*,

leaves floating.

culms almost erect,
tops nodding.

sterile fronds spreading
ascending, fertile fronds
erect.

roots deep yellow;
stems prostrate.

culms in small tufts,
erect, spikelets purple.

culms ascending.

culms in loose tufts
spreading, practically
decumbent.

Quercus prinus, *Prunus
serotina*, *Carya* sp.
Robinia pseudo-acacia,
etc. On rocks *Spiraea
betulaefolia*, *Aureolaria laevigata*,
Polypodium vulgare, *Woodia
oblonga*, *Dryopteris marginalis*,
Asplenium platyneuron, etc.

July 5 - Fort Valley,
at intersection of main
road and Woodstock Rd.

Road cut in Devonian
shale - Fossil brachiopods
abundant, in thin layers,
some ferns - Cheilanthes
and Asplenium on ledges
and in crevices.

July 5 - Elizabeth Furnace,
Fort Valley, Massanutten
Mts.

Flat valley bottom
covered by cut-over
woods, mostly small
hardwood, some
Pinus virginiana,
a little *P. rigida*. The
larger pines mostly
recently cut out.

Bottom-land along
Passage creek rather
densely wooded,
little undergrowth
except occasional
Liriodendron.

Passage Creek here is
about 6 m. wide, with a
rocky bed with gravel
between the rocks. In
shallow places are large
colonies of *Jussiaea americana*,
about 3-4 dm. tall, in flower.

Clumps of *Alnus serrulata*
3-5 m. tall hang over the
banks. Above this is
Carpinus, *Acer rubrum*,
etc. In the stream
are two of what appear
to be fresh water Rhodophyceae.
One is a coarse filamentous
greenish plant up to 5 cm.
long, with conspicuous
nodes. The other a
brownish gelatinous
thallus, broadly linear,
crisped, growing in
clumps on rocks and
pebbles, frequently small
clumps on backs of
snails.

The level of the stream
at this time is about 2 m.
below the level of the flood
plain.

July 26, Great Falls Park
Ground generally wet.
streams flowing in
small ravines.

Phlox paniculata in flower.
Rabbit, ~~and~~ wood thrush,
crow seen.

Labrador
2004

39530

July 27 - Little Stony Man Trail,
Shenandoah National Park

Galium

common in thick ~~oak~~ hardwood
forest on east slope.

Labrador
2004

39531

July 28 - Dickey Ridge Picnic
Ground
on rocky outcrop in
thin woodland

Galium

common

2

39532

Sanicula

uncommon

Plant communities in
SNP. That should be described:

Hemlock groves

Shale cuts

Greenstone cuts

Red oak forests

Chestnut oak forests

Earth banks along road

Woody

Myrica

3700'

1000 m

procumbent

procumbent, elongate.

leaves dark green; flowers
blue-violet with two
white marks on palate.

Meadows

Forest thickets

Bear oak scrub

Hardwood coves

Scarlet oak - Mt. Laurel

Pine woods

~~Aug.~~ July 31 - 71st. and P Sts N.W.
Washington

39533

Lolium perenne L.

between sidewalk and curb

71st & P. N.E. corner bet.
sidewalks and curb, nearly
full sun (a), another short
section, more shady (b)

	(a)	(b)
<i>Setaria viridis</i>	c	
<i>Lepidium virginicum</i>	c	c
<i>Digitaria ischaemum</i>	c	c
<i>Polygonum aviculare</i>	c	o
<i>Eleusine indica</i>	c	
<i>Plantago rugelii</i>	o	o
<i>Polygonum pennsylvanicum</i> (P. sterile)	o	
<i>Lolium perenne</i>		o
<i>Tridens flavus</i>		c

Aug. 1 - Pinefields Shelter
second-growth broad-leaf
forest.

- 39534
5 *Scutellaria serrata* Andr.
small dense colony in
opening in small draw

Aug. 1 - Appalachian Trail
north of Pinefield Gap
old field with small
trees

- 1 35 *Diodia teres*
local along trail
5 36 *Parthenocissus quinquefolia*
common climbing on
bushes and trees

Gentle slopes and rounded
low ridges, grassy with
irregularly scattered ~~beech~~
young trees, mostly *Robinia*
but locally *Pinus rigida*,
P. pungens, *Crataegus musgalli*
some *Sassafras*. Two species
of *Rubus*, one erect (*R. argutus*?)
and one low, locally abun-
dant, esp. the low one. Many
herbs in grassy areas -
Chrysanthemum leucanthemum,
Linaria vulgaris, *Rudbeckia*
hirta, *Triosteum* (bet. *perfoliatum*
and *aurantiacum*), *Asclepias*
syriacum, *Scrophularia*

caespitose, 3-4 stems
in a clump.

flowers lavender.

woody vine; leaves
glaucous beneath.

Aug. 2 - Paine Run Fire Rd.

Pine-oak woodland

Moderate slope facing north, with scattered *Pinus rigida* and *Quercus falcata* spaced unevenly, crowns from touching to about their own width apart, mostly 10-15 m. tall, pine trunks

up to 2 dm. dbh. A few small *P. virginiana*

A layer 2-3 (4) m. high of *Quercus ilicifolia*, *Hammamelis*, and *Kalmia* with some *Castanea pumila*, *Nyssa sylvatica* and *Sassafras* and oak saplings, ^{*Castanea dentata* sprouts,} forming a rather continuous but not very dense scrub.

Under this a layer 0.5-1 m. tall of *Gaultheria procumbens*, *Vaccinium vacillans*, *Menziesia*, *Kalmia latifolia*, *Vaccinium stamineum*, *Pteridium*

aquilinum, ^{*Solidago* spp., *Myrica perrepens* (2)} saplings of

Nyssa, oak, *Sassafras*, *Acer rubrum*, ^{*Castanea dentata* sprouts} forming a dense scrub.

Ground layer very sparse, of *Gaultheria procumbens*, *Epigaea repens*, *Vaccinium vacillans*, *Chimaphila maculata* (2), *Baptisia tinctoria* (in thin spots), *Lycopodium complanatum*, *Spiraea*

1600-1700'

1500'

~~stat.~~ *Betula pumila*, *Iris cristata* (?) (2)

Paine Run - rocky bed of stream running across transverse tilted shale beds with crevices. *Polytrichum* and a number of other mosses forming cushions and mats in crevices. Higher plants in crevices characterized by long dense root systems.

c *Panicum* at least 3 or 4 spp.

o *Carex* spp.

c *Achillea millefolium*

c *Aster cordifolia*

c *Eupatorium purpureum*

c *Hypericum montanum*

~ *Campanula*

Aster lateriflorus?

Viola sp.

o *Desmodium illinoense*

o *Alnus serrulata* (sprout)

~ *Platanus occidentalis* (seedling)

o *Betula lenta* (seedling)

o *Hydrangea arborescens*

~ *Nyssa sylvatica* (seedling)

o *Juncus*

~ *Menziesia pilosa* (seedling)

o *Lyonia ligustrina* (seedling)

~ *Kalmia latifolia* (seedling)

o *Solidago* sp.

Plants in
more abundant
in higher elevations
than in lower
parts of stream bed
near mosses

Aug. 2 Trayfoot Mt. Trail
up from Paine Run.

1600'

Medium east slope with
broken quartzite abundant
in soil. Low forest
mostly *Quercus*
marilandica about
5 m. tall with scattered
small pines ^{& *Quercus coccinea*} to 10 m. tall.
Some *Quercus ilicifolia*
Kalmia, *Sassafras*, *Amelanchier*
arborescens, ^{*Nyssa*, *Carya* sp.} etc. Making up
a very sparse ~~see~~ under
story 2-3 m. tall.

Dense lower story 0.3-0.6 m.
Tall of *Gaylussacia baccata*
and *Vaccinium vacillans* ^{abundant}
In open spots *Carex* sp. *Tephrosia*
virginiana, *Baptisia tinctoria*.
This is very distinctive
but rather restricted. Probably
represents an old severe fire.

Above this, at perhaps 1750'
is denser forest about 15-20 m.
tall, of *Nyssa*, *Carya* sp., *Quercus*
prinus, *Q. coccinea*, *Cornus*
florida, *Diospyros*.

Scattered seedlings to 1 m. or more
tall of *Sassafras*, *Carlaea dentata*
sprouts.

Moderately dense ground
layer of *Vaccinium vacillans*,

seedlings of *Sassafras*, etc.
This thin out to almost nothing
where quartzite talus is abundant.

2100'

Lower end of ridge of
Trayfoot Mt. is a quartzite
outcrop with low
sparse scrub of *Quercus*
marilandica, *Pinus virginiana*,
P. rigida, *Rhus copallina*,
Robinia pseudo-acacia,
Rubus arguta, *Quercus ilicifolia*,
Q. prinus, *Carya* sp., *Acer*
rubrum, *Amelanchier*
arborescens (?) (n.), etc. *Vitis* (*glauca* small)
Danthonia spicata in openings.
On quartzite *Umbilicaria*
is abundant, *Polypodium vulgare*, ⁱⁿ
shaded crevices.
Tephrosia, *Carex* sp., *Spiraea*
betulaefolia, *Vaccinium*
vacillans, *Potentilla simplex*?
in openings, also *Paronychia*
virginiana rare, *Phlox ovata*
rare. *Heuchera*.

2200'

-2700'

Above this low mixed
forest, oaks, pine, *Sassafras*,
etc. In this on ridge several
very small openings where
all trees have died, dead
sticks still standing or
bent over. No apparent
reason. Possibly all were
Sassafras, or *Quercus montana*,
and were killed by a disease.

Aug. 2 - Skyline Drive, head of
Dundo Hollow, just s.w. of Brown's gap
39537 *Salix caroliniana* Michx.
" on talus below road

Aug. 2 - Skyline Drive, Doyle River
Overlook,
roadside, in hardwood forest

- 4 38 *Carya glabra* (Mill.) Sweet
common
3 39 *Quercus velutina*
common
3 40 *Polygonum convolvulus* L.
abundant on
1 41 *Hedyotis purpurea* v. *longifolia*
occasional on
3 42 *Tragopogon pratensis* L.
occasional on
3 43 *Mentha spicata* L.
abundant on

Aug. 2 - Paine Run, Augusta Co.
in seepy place along road in
hardwood forest

- 1 44 *Eleocharis*
rare
4 45 *Scirpus polyphyllus*?
common
1 46 *Scirpus cyperinus* (L.) Kunth.
rare
#7
same - in crevices in open
rock bed of stream
1 47 *Panicum*
occasional

7500'

shrub 1.5 m. tall.

7950'

870 m

tree about 10 m. tall.
fruit immature
low spreading tree, 8 m. tall
ascending, old leaves reddish.
corolla bright lavender.
flowers yellow.
aromatic herb; flowers
pale lavender.

~~part~~ partial peduncles
curving upward.
erect, heads pendent

39548 *Carex*

1 rare

2 49 *Panicum*
common3 50 *Panicum*
rare1 51 (grass) *Agrostis perennans*
rare1 52 *Panicum*
occasional3 53 *Carex*
occasional1 54 *Panicum*
occasional2 55 *Juncus tenuis* f. *monetiflorus*
common1 56 *Aster divaricatus* L.
common1 57 *Campanula divaricata*
rare1 58 *Hypericum mutilum* L.

Aug. 2 Trayfoot Mt. Trail,
Left Hand Hollow, Augusta Co.
in mixed pine and hardwood
forest

3 59 *Galium pilosum* var. *montanum*
occasional in thin places2 60 *Hedyotis purpurea* var. *tenuifolia*
common3 61 *Galium circaeazans*
common1 62 ~~*Phlox ovata*~~? *Penstemon brevisepalus*
occasional

densely caespitose,
culms prostrate &
ascending, 1 m. long.

densely caespitose, culms
ascending, spikes pendent.

rays pale lavender to white,
disk yellow.

pale flowers pale
blue-lavender.

stems ascending

39563 *Panicum*

1 occasional

4 64 *Chenopodium umbellata*
local on flat ground near stream1 65 *Monotropa uniflora* L.
rare, on flat ground along stream2 66 *Ascyrum hypericifolium* var. *multicaule*
occasional on steep slope
apparently burned over at
some time.1 67 *Leschea minor* L.
very local on steep, burned
slope.Aug. 2 - southwest ridge
of Trayfoot mt.3 68 *Asclepias verticillata*
occasional in open
scrubby woods.2 69 *Clitoria mariana* L.
occasional in woods4 70 *Aralia hispida*
local on ledges of quartzite
outcrops in open.

71

same, rock ledges on
west side3 71 *Carex*
shaded3 72 *Quercus rubra*
common73 *Ribes rotundifolium* Michx.
rare on

1500' leaves glossy.

↓

prostrate; flowers
yellow, petals 4, tending
to be in pairs.

flowers white.

stems ascending; leaves
dark green; flowers lavender
purple.erect, suffrutescent herb
up to 0.3 m. tall, ripe fruit
bluish black.

caespitose, spike, drooping.

- 39575 *Panicum bozei* Poir
local on ridge in woods
76 *Scutellaria*
rare on great rocks

Aug. 3 - South River Picnic ground
on roadsides

- 77 *Letaria viridis* var. *weemanni*
(R+S) Beane
common
78 *Letaria viridis* (L.) Beane
occasional
79 *Letaria geniculata* (Lam.) Beane
occasional
80 *Galinsoga ciliata* (Laf.) Blake
abundant

Aug. 3 - Pinefields Gap

- 81 *Galium*
local in old-field thickets

caespitosa

flowers white.

spikes green

spikes greenish

spikes yellowish

rays white

forming dense tangle,
stems 1 m. or more long,
flowers cream-white,
4-parted.

Aug. 5 - Washington
New Hampshire Ave. between
N and O N.W.

Former lawn between
sidewalk and curb - 3
sections of 50', one 6', other 50' ±
rather well shaded.

	50'	6'	50'
<i>Taraxacum officinale</i>	c	o	~
<i>Trifolium repens</i>	a	✓	c
<i>Plantago rugelii</i>	c	✓	o
<i>Plantago lanceolata</i>	o	✓	c
<i>Poa annua</i>	c	✓	a
<i>Polygonum persicaria</i>	o		
<i>Polygonum aviculare</i>	o	✓	o
<i>Eleusine indica</i>			o!
<i>Lactaria viridis</i>	o	c	o
<i>Muhlenbergia schreberi</i>	o	c	
<i>Bidens bipinnata</i>	~		
<i>Lepidium virginicum</i>		~	~
<i>Digitaria sanguinalis</i>		c	a
<i>Ailanthus altissima</i>			seedling

Aug. 5 Washington

N St. NW, bet. New Hampshire Ave
and 21st St. thin shade.
in 3x6 spaces around trees
next to curb. n. side of st.
from e. to w.

<i>Chenopodium ambrosioides</i>					~
<i>Lactaria viridis</i>	a	c	a		
<i>Polygonum aviculare</i>	c	c	c	~	o
<i>Plantago lanceolata</i>	~				
<i>Ulmus</i> sp.	c				
<i>Euphorbia supina</i>	o				c
<i>Lepidium virginicum</i>	c		o	o	o
<i>Trifolium repens</i>	~				c
<i>Digitaria sanguinalis</i>	o	o	c	a	c
<i>Trifolium repens</i>		c	a	c	c
<i>Plantago rugelii</i>		c	~	c	c
<i>Muhlenbergia schreberi</i>		c			o
<i>Panicum ^{distachyon} raspatorium</i>		c	~		c
<i>Chenopodium alba</i>			~		
<i>Bidens flava</i>				o	c
<i>Viola</i> sp.					~
<i>Eleusine indica</i>					o
<i>Poa annua</i>					o
<i>Oralis corniculata</i>					~

Aug. 6 - Great Falls

Flats between old road and the foot of slope up to entrance road, beyond the horse trail running up to the entrance road and beyond the easternmost picnic ground road are mostly swamp.

The swamp has

Arisaema triphyllum
Saururus cernuus
Impatiens capensis
Oxycoccus ~~pennsylvanicus~~ villosus
Lindera benzoin
Ilex verticillata
Rhus toxicodendron
Acer rubrum
Symphlocarpus foetidus
Viburnum dentatum
Rubus sp.
Nyssa sylvatica
Cuscuta sp.
Eupatorium fistulosum
Smilax rotundifolia
Osmunda regalis
Osmunda claytonii ? a com.
Polygonum arifolium
Calla
Quercus
Cryptotaenia canadensis
Smilax hispida
Thalictrum sp.

Viburnum ~~brunifolium~~ ^{brunifolium}
Glechomeia splendens
Parthenocissus quinquefolia
Athyrium sp.
Dryopteris cristata
Lonicera japonica
 several grasses and sedges.
~~*Thalictrum*~~
Polystichum acrostichoides
 + ~~*Stagnum*~~ *Pyropropodium obscurum*
 on hummocks.

This swamp lies between the cliff below the road and a ridge of schist along which skirts the old road. At the south end of the swamp is another ridge. These ridges covered by oak-hickory forest.

- Aug. 9 - Franklin Cliffs
 39582 *Polygonum ~~sp.~~* ^{tenne}
 on rock ledges

Aug. 9 Skyland
 around resort

- 1 83 (cous.) *Hesperis matronalis* L.
 one small colony near trail
 in shade
 1 84 *Picea ~~mariana~~* *mariana* pungens
 planted near cottage
 2 85 *Fagus sylvatica* var. *atropurpurea*
 planted near cottage

Aug. 9 slopes of Stony Man
 Mountain along Appalachian
 Trail ~~near~~ north of Skyland
 in mixed hemlock and
 hardwood forest on steep ^{west} slope

- 2 86 *Betula ~~sylvatica~~* ^{*albipinnata*}
 common
 2 87 *Ribes rotundifolia* ?
 on rock cliff

88

Aug. 9 - Little Stony Man Cliffs,
 along Appalachian Trail

- 1 88 *Spiraea latifolia* var. *septentrionalis* ?
 common on tops of cliffs

Aug. 9 - Stony Man Mountain
 on wooded summit

- 1 89 *Ilex montana*
 in undergrowth

decumbent at base

stems 1 m. tall, mostly
 in fruit; flowers purple.

Tree 10 m. tall, blue-gray.

Tree 15 m. tall, slightly
 coppery ~~not~~ green.

small tree, bark yellowish
 gray, wintergreen odor.
 pendent shrub 1.5 m. long.

low shrub 2-3 dm. tall,
 flowers white, pinkish
 in centers.

slender shrub 2 m. tall,
 fruit immature

- 39590 *Ilex montana*
 2 on edge of cliff
 1 91 *Liatris scariosa*?
 rare

Aug. 9 - Stony Man Mountain
 on open rock cliffs near
 summit, north west side

- 2 92 *Juncus*
 in crevices
 1 93 *Lycopodium* selago
 rare in crevices
 1 94 *Taxus canadensis*
 colony several m. in diameter
 just back of top of cliff
 1 95 *Polygonum ~~saxatile~~ ^{terre}*
 rare on ledges
 1 96 (fern)
 common in crevices
 2 97 *Carex*
 occasional on ledges
 1 98 *Liatris scariosa*
 common at tops of cliffs

The rocky ledges and
 cliff tops have a character-
 istic community of *Phlox*
subulata, *basifraga*, *nichauxii*,
Potentilla tridentata, *Pennstemon*
punctilobula, *Solidago*
roanensis var. *monticola*,
Liatris graminifolia,
Salaginella rupestris,
Deschampsia caespitosa

dense shrub 2.5 m. tall,
 fruit immature.
 stem single, erect, flowers
 bright purple.

low, somewhat ascending,
 fruit immature, reflexed.

almost erect.

caespitose

caespitose, flowers bright
 purple.

Juncus sp., *Carex* sp.,
 and rarely, *Lycopodium selago*.
 growing in crevices and on ledges.
 In most localities only
 part of these are present.

Aug. 9 - Rapidan Fire Road
east of Big Meadows
shaly cut bank, 45° slope

Discrete clumps of
Campanula divaricata
up to 1 m. apart.

Scattered *Lysimachia*
quadrifolia, scattered
Rubus argutus, a few
tufts of *Panicum* sp.,

Danthonia spicata, *Hedyotis*
purpurea var. *longifolia*, a few
~~small~~ *Ribes* bushes, a few
scattered seedlings of
various things.

Above this a gently
sloping completely stony
surface, with scattered
clumps of chestnut and
Betula lenta sprouts -
abundant *Dennstaedtia*,
Lysimachia quadrifolia,
Danthonia and *Campanula*
divaricata, also *Aralia*
nudicaulis, some *Aquilegia*,
Pantherinum, ~~Cornus~~
Smilax racemosa,
Viola pinnatifolia,
Vaccinium vacillans, *Apocynum*
androsaemifolium, *Aster*
sp. not yet in flower, *Ribes*,
Solidago, *Lactuca*, a
few oak seedlings or small

sprouts under 1 m. tall.
Smilax hispida, *Oxycoccus*
Achillea, *Yucca aptera*,
Amianthum (red), *Sperula botulifolia*,
Corylus americana, *Hedyotis purp. v. longifolia*.
Chestnut sprouts fruiting
abundantly.

Aug. 9 - Upper Rapidan Fire
Road, just east of Big Meadows

39599 *Betula lenta*

in open meadows

39600 *Agrimonia gryposepala* Willd.

in open woodland

4 01 *Bromus*

abundant around old dump

3 02 *Salix humilis* Marsh.

occasional in open woodland

3 03 (fem) *Pennstaeidia punctilobula*

abundant in edge of

forest on flat ground

2 04 *Ribes*

occasional on very rocky
open ground

3 05 *Pennstaeidia punctilobula*

abundant on very
rocky ground in open.

Aug. 10 - Canyon of South River
north side, along Fire Road.
in road, shaded.

1 06 *Polygonum punctatum*

1 07 *X Polygonum dubium*

1 08 *Gallium triflorum* var. *asprelliflorum*

Aug. 10 - head of South River Falls
South River

2 09 *Betula ~~lenta~~ alleghaniensis* Britton
bottom of wooded canyon

bushy tree 8 m. tall

flowers yellow.

~~spike~~ ~~in~~ ~~the~~ panicle
drooping, culms erect.
shrub, many stemmed
from base, to 2.5 m. tall,
shoots 1.5 m., leaves
glaucous beneath
tendrils erect from
shallowly buried rhizome,
small bushes, fruit immature.

tendrils erect from rhizome,
deeply buried between
rocks.

flowers greenish, spikes nodding.
flowers pinkish white.
prostrate; flowers pale green.

tree 15 m. tall, wintergreen
odor when broken, bark
yellowish gray.

Aug. 10 - flats north of
South River, in detached
area of Shenandoah Park on
left fork of South River Field.
Old field grown up to
broken thickets of *Robinia*,
Sassafras, *Pinus virginiana*,
Cornus florida, *Pyrus coronaria*,
with some *Rhus typhina*, *P. glabra*,
Pinus strobus, *P. rigida*,
Liriodendron, *Pyrus malus*,
uneven height but
mostly 5-10 m. *Vitis*, *Partheno-*
ceus, etc. common.

Openings with *Fragaria*
and *Rubus flagellaris*
dominant, *Aster ericoides*,
Solidago spp. *Chrysanthemum*
leucanthemum, *Prunella*, *Adiantum*,
Daucus carota, *Cirsium*
lanceolatum, etc. common.

Aug. 10 - South River Cemetery
open ground in old weedy
cemetery

- 39610 *Vinca minor*
abundant
11 *Spiraea prunifolia*
common
12 ~~Thalictrum~~ *Miscanthus sinensis*
common
13 *Oenothera biennis*
common
14 *Pinus rigida*
near open old field with scattered trees

prostrate; sterile.

slender shrub 1-1.5 m. tall,
sterile.

large clumps up to 2 m. tall,
with last years panicles.

sterile

tree 8 m. tall.

Aug. 10 - 1 mile north of
South River Overlook, on
Skyline Drive

Around old farm site

394615

Syringa vulgaris L.

3

16 *Buxus sempervirens* L.

2

17 *Abies balsamea*

3

18 *Rosa canina* L.?

2

19 *Rosa cinnamomea* L.?

3

20 *Pyrus coronaria*

common in hedges and
old fields

2

21 (grass) *Arrhenatherum elatius*
roadside

980 m.

small tree 3 m. tall, very
bushy; fruit immature.

~~shrub~~ very dense shrub.

bushy small tree 4 m. tall,

tips of twigs bent down -

diseased - mutant form?

scrambling bushy,

leaves dark green, sub-glossy

above, flowers rose-pink

scrambling bushy, leaves

dull above, sterile, very

densely branched low

tree, 6 m. tall, fruits

immature.

culms erect, panicles

nodding.

Aug. 21 - Clifton - Triassic shales and consequent purplish red soils begin here. Curious ~~erosion remnants~~ or basalt intrusions on boundary Clifton - Little Falls and well into Little Falls, forming a complex dissected wooded ridge, quarry and many houses on it. Deciduous forest.

Pellington - pale gray-brown soil. Gallery forest along Pompton River very tall, pin oaks, etc. Flat country w. of river with pale brown alluvial soil with large boulders. Mostly farmed but some small second-growth wood-lots. Largely Acer rubrum. Betula populifolia, some oaks. Extends past Rockaway River. Mostly small farms scattered trees and small bits of woods. Scattered large oaks. High ground to west has several nice patches of woods. Two everts in pond east of Denville.

Mountain Lakes Borough much mixed woods on low rolling hills.

East of Dover near Rockaway River low hills are of either

glacial material or outwash alluvium. South of Dover in distance are wooded hills or low mountains.

East of Dover some humps of gneiss, etc. sticking up through alluvial material.

Between Dover and Netcong are hills of a hard rock, some parts look like granite, parts darker and denser, cut by dikes. Wooded.

All woods in this part of state are deciduous. Budd Lake, lined with resorts and swimming beaches. 1000+ alt.

West mixed woods on slope. Then a plateau of stony alluvium. Then a series of ridges and valleys running n.e.-s.w. the ridges wooded.

Musconetcong River Valley flat and in farms, bounded by long rounded ridges. Ridges wooded with many cleared fields and pastures, some abandoned, fertile flat ~~at~~ bottom-lands along streams farmed more intensively.

Valley of Pequonnock River

broad flat, in farms.
Ridges on both sides mostly
wooded, especially Mt.
Mokapepoke on n. w. side.

This area is a miniature
"valley and ridge province".
Rocks varied but not well
exposed along highway.
Woods all deciduous, not
a conifer seen anywhere
except cultivated spruces at
Buttville. A few *Juniperus*
virginiana also, wild, at Buttville.

Near Manunkachunks
bluffs of phyllitic shale.
A conifer here that did not
look quite like *Tsuga* - more
like *Larix*, but probably not.
Did not get a good look at it.
More just south of Delaware
on bluffs. Possibly *Picea abies*
or *P. glauca*. Otherwise all
deciduous.

Delaware Water Gap -
on south sided steep wooded
slopes interspersed with
bare rock cliffs and scree
slopes. Much more cliffs
and talus on north side.
Great scree slope invaded
by *Betula*, *Juniperus*, etc.

On bluffs forest is mostly
broadleaf, but some conifers
(*Picea*? *Juniperus*? *Abies*?) are and

Probably
Tsuga

Pinus.

On Pennsylvania side
after passing Gap the
conifers form a noticeable
component of the forest -
much *Betula*, some tulip,
Platanus, *Juglans*, *Ulmus*,
Quercus.

Up on Pocono terrace beyond
Stroudsburg, to beyond
Tannersville, a mosaic
of woods, fields, etc. The
woods principally deciduous
but with a considerable
coniferous component.

Conifers - *Tsuga*, *Pinus*. These
more abundant westward.

This country, along the
highway, has a very
manicured appearance.
Fine patch of medium
growth *Tsuga* on left of
turn-off to Pocono at
Swiftwater. Road to
Pocono through much
wilder country, still
some cottages, etc.

Red pine, paper birch, white
pine, black birch, elm,
sugar maple, hickory,
chestnut oak, red maple,
sassafras, red oak, chestnut
sprouts.

Most of this is very ~~young~~

young second growth.
5-8 m. tall with scattered
larger trees. Some much
younger, very bushy.
Some *Pinus rigida*,
with birches, old maple,
and oaks. *Q. ilicifolia*,
Viburnum cassinoides,
Populus tremuloides, typical
fire country.

Conifers - *Pinus strobus*,
P. resinosa, *P. rigida*, *Picea*
rubens, *Tsuga*, plus
introduced *Picea engelmannii*,
P. abies, *Pinus sylvestris*, *Larix*
laricina (?) very noticeable
around Pocono Pines, but
not dominant. Birches,
Acer, *Populus*, etc. abundant.

Beautiful patch of *Tsuga*
woods west of Pocono Lake.

West of this much planting
of miscellaneous conifers
in old fields, more beautiful
old hemlock and hardwood
forest.

Halfway bet. Pocono Lake and
Blakeslee a farming area
begins. Then more bushy
woods, conifers and *Populus*
tremuloides. Then much
planting of blue spruce -
for Christmas trees?

The country east of here was

evidently what 20 years
ago was largely an open
burned over country
dominated by *Spiraea latifolia*.

West of Blakeslee, also,
is scrubby second growth.

Rhododendron maximum
common in woods east
of P. side. All of the
woods here are second-growth
slender, 10-15 m. tall, or
locally to 20 m. Mostly
Betula and *Acer rubrum*,
very few conifers. Red
Triassic shale makes up
the east side of the Lehigh
Valley at White Haven.

West side also.

Between White Haven and
Freeland a broad valley
with orchards, ridges on
sides wooded. Road cuts
in shale covered by
Comptonia peregrina, invaded
by *Petula* spp.

Toward Freeland very
scrubby mixed deciduous
second growth. Much
scrub, principally *Quercus*
ilicifolia, with scattered
trees.

Beyond Freeland are massive
open pit coal mines and
enormous bare culm piles.

39622

7

Aug. 21 between Freeland
and ~~Hager~~ Eberwall, Luzerne Co.
Echinochloa
desiccating roadside pool
in coal mine area

Southwest of Hazleton
are vast areas of open
pits and culm piles.
Betula is making some
headway invading the
culm piles. Farther on
much older mines,
somewhat wooded, mostly
with small birches.
Beyond Sheffton in valley
of Catawissa Creek more
purple Triassic(?) shale.

Aug. 22 - Bottomlands along
west branch of Susquehanna
River above Northumberland -
mostly farmed but some
small patches of dense
woods, largely *Robinia* and
Acer saccharinum.

Valley of Buffalo Creek, west of
Mifflintown - broad rolling
flat bottom, almost all farmed,
with hedgerows of trees.
Long ridges on both sides
completely wooded except for
conspicuous bare spots of talus on
north side. Deciduous woods

w. e. of Hazleton

culms spreading to
ascending, spikelets
~~deep~~ deep maroon or green.

with considerable conifer
admixture and patches
near the top on south side.
Sharp break in character
of forest about $\frac{1}{2}$ the way
up on north side, probably
corresponding to a change in
slope. The lower third much
finer textured, possibly second growth.

Pennsylvania State forest
on high ground between this
valley and the one where
Woodward is located. Dense
hardwood forest. Nice
picnic ground. Valley to west
very similar to that of
Buffalo Cr. more hilly.

East of State Coll. are
several ridges of bedded
bluish-gray limestone.

From northwest of State College
on top of wooded ridge, looking
northwest or north across
Eagle Creek is a great expanse
of woods, mostly deciduous,
some admixture of conifers.
Valley bottoms with clearings.
(Photos 21-22 (1)). From this view.

South slope of Eagle Creek Valley covered by a dense second growth forest, about 10 m. high, trees up to 15 cm. diam. mostly much less.

Quercus rubra

Quercus alba

Betula lenta

Acer rubrum

Quercus prinus

Fraxinus americana

Liriodendron tulipifera

occasional small *Taxus* & *Pinus strobus*

Thin understory of *Cornus florida*, *Acer pensyl-vanicum*, smaller *Kalmia latifolia*, ~~small~~ *Betula* etc.

The cut bank of the highway grassy but abundantly invaded by *Robinia pseudo-acacia*. The source of seeds not at all evident.

Similar woods almost continuous, except for one fair sized open area, almost to Phillipsburg. Being logged in a few spots.

Moshannon State Forest bet. Clearfield and Rockton is

dominantly a mixture of oaks, with occasional other trees, where it has not been cut or burned recently.

Cook Forest State Park - magnificent hemlock and white pine (several photos). 4 acres of Cathedral Area thrown by wind - mostly cleared out by Pa. Dept. Fa. & Waters to protect the public from fires. A few trees left to show public what storms do.

Aug. 23 - Bottomlands of Muskingum River bet. Coshocton and Dresden along highway (27)

Large areas of marsh land some swampy woods and sloughs, cultivated fields, hay and maize, on higher areas.

Near Trimway in a wooded slough 6 wood ducks. Many aggressive mosquitos.

Woods along slough of large elms, Juglans, Platanus, *Populus deltoides*, *Quercus prinus* (a very broad leaf *Q. bicolor*), *Acer negundo*,

little
Melospiza

~~and~~ *Prunus serotina*, *Gleditsia*
triacantha, *Acer saccharum*
in understory *Aesculus*
opacifolia, *Quercus*
imbricaria, etc.

Campanula americana
very common in edges
of wood, much darker
blue than in Virginia.

Tall blue and yellow *Lactuca*
abundant. *Lycyos*, *Vitis*,
and a very large *Polygonum*
sect. *Tinaria* climbing
in edges. *Impatiens capensis*
and *I. pallida* both flowering

Aug. 24 - ^{several miles} south of Bursley -
open bottom-land forest, principally
Juglans nigra, with
conspicuous ground layer
1 m. tall of a sunflower.
Fields nearby with
conspicuous stands of
Vernonia.

S.W. of Hartsville outcrops
of bedded limestone on edge
of broad shallow stream ravine.
Farther along where rock
does not outcrop is a beautiful
juniper woodland on
rolling hills which form
the edge of the ravine.

Aug. 26 - southeast of Bloomington,
Monroe Co.

Deeply incised drainage
system of Salt Creek about
250' relief. canyon walls
densely wooded. The
woods badly cut over
and composed mostly
of small sized trees,
entirely deciduous
oak-hickory, with some
tulip, much sassafras, etc.
Flat ridge-tops and bottoms
cultivated or pastured.

Soil rather sterile,
first crops after clearing
very good. soon falling
off, this especially on ridges.
Bottom lands still rather
intensively farmed, ridges
not so much so. much
sumac bush, sassafras,
etc. on abandoned fields.

Nearer to Bloomington is
a rolling outwash plain,
more intensively farmed
but very worn-out. much
land abandoned. Wahl farm
being largely turned into
pasture - very sterile soil
being heavily fertilized, planted
to grass, clover and *Lespedeza striata*.
This being grazed lightly. Areas in
forest and game preserve.

Aug. 27 - Pine Hills

Gorges cut several hundred feet into a flat plateau of horizontal sedimentary beds.

On the flat upland most of the vegetation is old field thicket with introduced pines.

Where there is good forest it is mostly white oak with some ~~some~~ *Acer nigrum* var. and some *Carya*, some other oaks (*Q. velutina*?).

On knife-edge ridges *Melilotus alba*, *Phytostegia virginiana*, dwarf form of *Monarda fistulosa*, etc.

Generally speaking the plateau is covered by oak-hickory forest with emphasis on oaks and considerable tulip. The slopes and bottoms are covered by beech-maple with abundant hemlock and some white pine, much *Ostrya*, *Carpinus*, etc.

On ~~steep~~ slopes the vegetation is mixed - on ~~down~~ on gentler ones *Fagus* is very common, mixed with beech. *Epifagus* common but no *Maianthemum*. Occasional tulip, red oak, sugar maple. *Mitchella* common.

Steep slopes have hemlock, *Taxus*, *Fagus*, *Ostrya*. Cliffs in places bare.

Dusty ledge under overhanging bed of sandstone has large colony of ant lions. Large dead insects common, fairly large larvae caught and struggling or almost dead.

Bottom-land with *Ostrya*, *Carpinus*, *Fagus*, *Populus deltoides*, *Liriodendron*, *Asimina*, *Platanus*, *Cercis*, *Acer nigrum*, *Cornus florida*,

Finished Kodachrome roll on entire axes roll, started another various views.

Aug. 29 - Pine Hills,

39623

Echinochloa

in road in old field in full sun

24

Echinochloa

in road in shade around mudhole

25

Hedyotis purpurea var. *calycosa*

on knife-edge ridge on sandstone, almost full sun

Aug. 29 - Wabash Natural Area,
Sugar Creek, northwest of
Annapolis, St. Patrick Co.

Partly old second-growth
forest, small part old
field with ~~small~~
scattered small sapling
regrowth.

The second growth nature
is indicated by large
Sassafras albidum in
abundance, even though
some oaks and beeches
are up to 1 m. dbh. The
forest is mixed *Quercus*
alba, *Q. rubra*?, *Q. palustris*?
Q. nigra var. *Q. agrifolia*, etc. *Ulmus* sp.

Some of the red oaks are
succumbing to oak wilt.

In parts there is an
abundant layer of
Ulmus saplings up to about
1 m. tall, though few seem
to attain more than that size

FIELD TRIP TO PINE HILLS AND THE WABASH NATURAL AREA, SPONSORED
BY THE ECOLOGICAL SOCIETY OF AMERICA, THE NATURE CONSERVANCY,
AND THE NATIONAL ASSOCIATION OF BIOLOGY TEACHERS, ON FRIDAY,
AUGUST 29, 1958

Description of Pine Hills

Smith (1933) has described the geology and geomorphology of Pine Hills, and presents a topographic map of the area. Pine Hills lies within the glacial boundary in west central Indiana, occurring in the Till Plains Section of the Central Lowland Province. The physiographically most striking features of the region are the deeply entrenched meanders with nearly vertical walls of two tributaries of Sugar Creek. In referring to the sharp ridges, or "backbones", thus produced, Smith says, "Without exaggeration, they may be considered as the most remarkable examples of incised meanders in the eastern United States. In fact, although they are exceeded in magnitude by such features in the Rockies, none exceeds them in perfection and in interest." The cause of meanders in such youthful topography Smith attributes to the peculiar effects of weathering and erosion in the Borden formation, this being especially susceptible to undercutting. All the bedrock exposed at Pine Hills is referred to this formation, and is composed mostly of shaly sandstones, only a small portion of which is fossiliferous. Owing to erosion glacial drift is thin to absent in the vicinity of the gorge.

With regard to the vegetation, Friesner and Potzger (1934) have written: "Botanically this region exhibits a larger number of excellent and clear-cut forest ecological areas and associations than any other region in Indiana known to the writers. For example: There are wooded old flood-plain terraces along the meandering streams, where they have cut wider valleys; second terraces or still older flood plains now occupied by dense stands of deciduous forest trees; upland plateaus into which the canyons have been cut; Pinus-Tsuga slopes; transition areas between the preceding two; Tsuga-covered canyon walls; Pinus-Tsuga groves, and Taxus associations on north-facing canyon walls where the angle approximates 45 degrees." A vegetation map and quantitative data are presented in this publication. The authors conclude that Acer saccharum is the "climatic climax" of this region, Fagus being greatly reduced compared to the area of Indiana to the east. Tsuga canadensis, here at the western margin of its range in the central states, and Pinus strobus are considered as relicts of a changing postglacial climate by those authors. Both these species occupy drier sites than the adjacent Acer-Fagus forest, as suggested by soil moisture and evaporation studies in certain other Tsuga-Pinus sites in Indiana. Soil pH studies indicate a decidedly more acid condition under the Tsuga stands than in adjacent deciduous forest (Potzger and Friesner 1936). The area has doubtless been selectively lumbered in the past, and in fact, one of the backbones ("Mill-Cut Backbone") was excavated at one point in the 1850's to operate a small woolen mill for a few years from the flow of water through the cut. The owners of the land have planted several species of pines on abandoned fields on the upland approaching the gorge.

Literature Cited

- Friesner, R. C., and J. E. Potzger. 1934. Climax conditions and ecological status of Pinus strobus, Taxus canadensis, and Tsuga canadensis in the Pine Hills region of Indiana. Butler Univ. Botanical Studies 3:65-83.
- Potzger, J. E., and R. C. Friesner. 1937. Soil acidity and hemlock reproduction in relic colonies in Indiana. Proc. Indiana Acad. Science 46:93-99.
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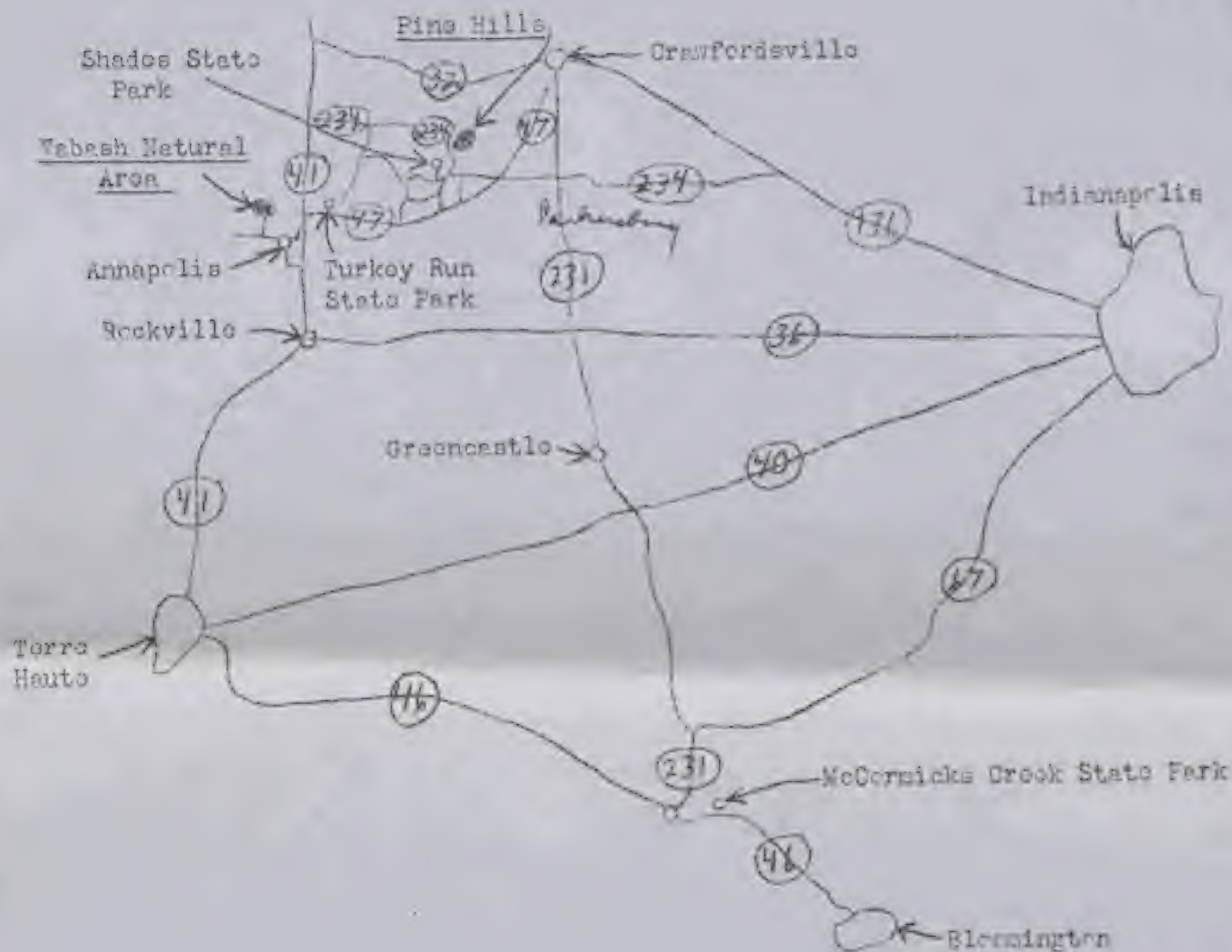
The Wabash Natural Area

Wabash College has recently been given jurisdiction over the late W. C. Alice farmstead, a 160 acre tract of mostly wooded land of rough topography bordering Sugar Creek. Dr. Alice had intended to retire to this area and continue his ecological research, but this wish was never fulfilled. A long-term ecological research program, however, has now been initiated on the property by the staff of Wabash College, under the direction of Dr. Richard Leubongayer. The project is financed by the Atomic Energy Commission, and involves taking as complete an inventory of the biota as possible, together with a detailed analysis of the environment, to serve as a basis for evaluating the effect of fallout on natural and seminatural ecosystems in this region. Several thousand dollars worth of instrumental equipment for microclimatological and soil measurements has been installed, and a laboratory building is being constructed on the premises. In addition to vegetational, microclimate, and soil analyses, such varied projects as rates of decay of wood, the limnology of Sugar Creek, migration of box turtles, old field succession, and the morphology and life history of *Epifagus* are also being investigated. The area and facilities are available to college classes and research workers from neighboring institutions as well as those from Wabash College itself.

IT IS REQUESTED THAT VISITORS NOT COLLECT IN PINE HILLS
OR THE WABASH NATURAL AREA

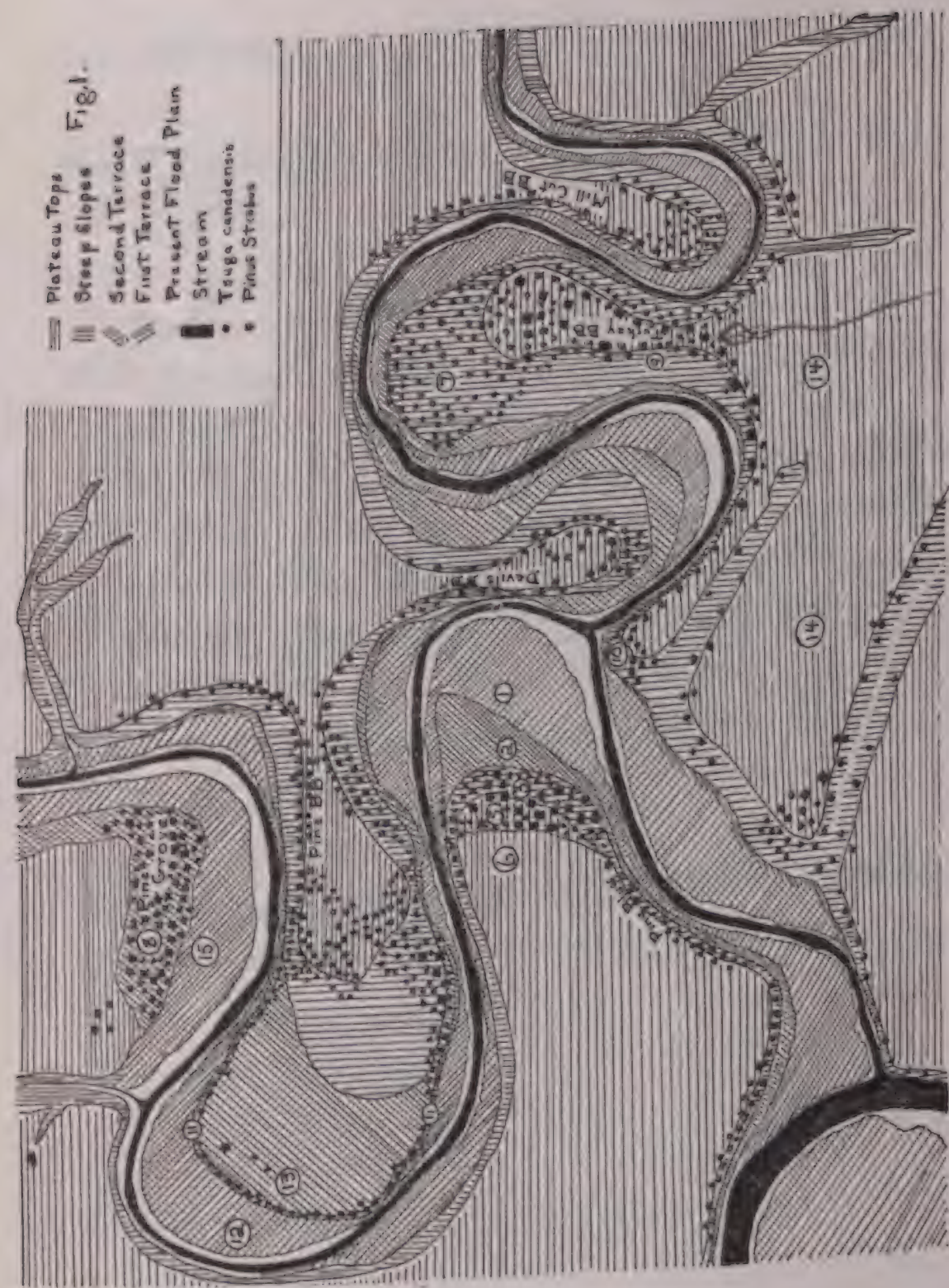
Field trip leaders: John Felton, Butler University, and Richard Leubongayer, Wabash College.

DIRECTIONS FOR REACHING PINE HILLS AND THE VABASH NATURAL AREA



To reach Pine Hills from Bloomington: Take Highway 46 to Spencer; then Highway 231 north to its junction with Highway 234. Turn west on 234 until a sharp turn north occurs in the road one mile east of Shades State Park. Continue north (on 234) for about one mile. A white house and red barn is situated on the west of the road, and cars may be parked here along the roadside. A jeep road extends to the east about $\frac{1}{2}$ mile to the gorge.

To reach the Vabash Natural Area from Pine Hills: Drive south to Highway 47, and then west to Highway 41. Turn south on 41 for about 1.4 miles, at which point turn west (at a Cities Service Station) on the road which will lead to the small town of Annapolis. Continue west on the gravel road leading out of town about 1.3 miles until the second road to the north is reached. Take this road to the Allee farm (0.4 miles). The road to the northwest of there leads to the instrumental stations and words. Cars should be parked in the field about 0.3 miles from the Allee farmstead.



culms spreading to erect,

culms erect, to 1.4 m. tall.

small clumps, flowers white.

and Ulmus is not abundant in canopy layer. Instruments that the Wabash College people had in old field and in woods indicate that the relative humidity and soil moisture are lower in the woods than in the old field.

A few plants in beech-maple-oak forest.

Aug. 29 - Pine Hills,

39643

Echinochloa

2

in road in old field in full sun

2

24

Echinochloa

in road in shade around mounds

1

25

Hedyotis purpurea var. *calycosa*
on knife-edge ridge on
sandstone, almost full sunAug. 29 - Wabash Natural Area,
Sugar Creek, northwest of
Annapolis, Leake Co.Partly old second-growth
forest, small part old
field with ~~small~~
scattered small sapling
regrowth.The second growth nature
is indicated by large
Sassafras albidum in
abundance, even though
some oaks and beeches
are up to 1 m. dbh. The
forest is mixed *Quercus*
alba, *Q. rubra*?, *Q. palustris*?
A. nigrum var. *Fagus*
grandifolia, etc. *Ulmus* sp.Some of the red oaks are
succumbing to oak wilt.In parts there is an
abundant layer of
Ulmus saplings up to about
1 m. tall, though few seem
to attain more than that size

culms spreading to erect,

culms erect, to 1.4 m. tall.

small clumps, flowers
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abundant in canopy layer.
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in old field and in woods
indicate that the relative
humidity and soil
moisture are lower in
the woods than in the
old field.A few photos in beech-maple-
oak forest.

Sept. 1 - Point Pelee National Park, Lake Erie, near Leamington.

A triangular spit jutting out into Lake Erie near its western end. Consists of a beach ridge on both sides enclosing low ground with extensive ponds and *Phragmites* marshes, these not connected with the lake. Along the west side are many lots with cottages in private ownership, several fields and orchards. The slightly higher sandy ground along the west side and near the point is covered by a deciduous forest with a large admixture of *Juniperus*, mostly tall rather typical *J. virginiana* but with also, in open places, a considerable series of low ascending and spreading to prostrate forms, possibly forming a hybrid complex. Around the margins of this forest *Ptelea trifoliata* and *Rhus canadensis* are common. *Asparagus officinalis*, etc.

Birds are plentiful.

The beach along the west side of the point is stabilized by use of very ugly L shaped slabs of concrete.

Between Windsor and Leamington is a thoroughly agricultural area on low broad terraces bordering the lake. Among crops noticed were peaches and a very little tobacco. The leaves of the latter were very large and a pale whitish green. Tomatoes are produced in great abundance.

Sept. 2 - East of Leamington, at least to Blenheim, tobacco is one of the principal crops, with maize and tomatoes, some peaches and plums.

Woodlots are extremely scarce, somewhat more common eastward till at Blenheim and eastward they are more a part of the landscape.

Along the shore are cliffs perhaps 20 m. high, bounding a very wide terrace of clay with small gravel which is eroding at the edge so rapidly that there is little or no vegetation on them (photos). Along the cliff top the principal plants are *Solidago* and

aster or low masses of
Rhus and Vitis sp.

Sept. 2 - 11 mi. w.s.w. of
Cedar Springs, 4 mi. s.e. of
Merlin, ~~near~~ Lake Erie.

39626 *Vitis riparia* Mx. possibly *V. rotundifolia*
climbing
on bushes at edge of cliff

2 27 *Ludwigia polycarpa*
very common in dry roadside
swale.

3 28 *Echinochloa*
very common in drying
roadside swale, with #39629.

3 29 *Echinochloa*
very common in drying
roadside swale, with #39629

Sept. 2 Rondeau Provincial Park
Lake Erie.

Flat sandy peninsula
densely wooded in interior
with mostly beech-maple,
some elm and oak. prominent
shrub layer, sparse ground layer.

At Point Aux Pins the forest
is largely *Fraxinus nigra* (?),
Quercus rubra ??, *Pinus strobus*,
Quercus alba, *Tilia* sp. *Sassafras*, etc.
Soil is a mixture of sand and
gravel. Rather thick undergrowth
of *Fraxinus* and *Sassafras*.

extensive woody vine,
fruits blue-black, not
sweet and with a disgusting
flavor.

culms almost erect.

culms almost erect.

saplings. Thick ground
layer of many herbs and
very small shrubs and
seedlings.

A ~~strip~~ strip back of the beach
about 10-15 m. wide has
herbs such as *Panicum* (?),
Polygonum, *Artemisia*, *Andropogon*
scoparius, *Apocynum cannabinum*
(a prostrate form), *Andropogon*
gerardi, etc. *Rhus toxicodendron* (dwarf form).

The *Quercus rubra* here is very
odd. Lvs not V-shaped buds large,
hairy.

Euphorbia
spinescens
hirsuta
Celastrus
scandens

In front beach *Ulmus*,
Ostrya, *Fagus*, *Acer rubrum*,
Acer nigrum var. become common.
Rhus toxicodendron and
R. canadensis common on
ground cover. *Maianthemum*
occasional, here under hardwood.

A form of *Asclepias*
tuberosus with very
small cyms and pale
orange flowers common in
clearings back of beach.

In central part of park
in deep forest is an elm
about 100' tall, 2 ft. + diam.
above buttresses. Buttresses
very wide, about 1 ft. high.
Dense ground cover of *Brickellia*,
Collinsonia, *Onoclea*. Area
low, swampy, with
beech-maple forest. Nearby
a *Populus deltoides* well over
100 ft. tall and over 3 ft. dbh.
Most trees in area ~~are~~ have
slight development of buttresses.

East of Morpeth the tobacco
gradually drops out, maize
and hay are principal crops.
Woodlots become larger and
more frequent, some apparently
natural, some planted.
Some pasture. Near Clearfield

ground here
is parallel
ridge,
abundant
from storm
beaches
which probably
1 m. at
most.

People come here for relaxation and enjoyment. Camping offers pleasure to many people. Please do not intrude upon, or disturb the enjoyment or rest of your fellow campers.

The Naturalist Programme of conducted walks, illustrated talks, labelled nature trails and a museum will increase your pleasure of the Park.

Rondeau attracts large numbers of people who come to enjoy a picnic, the beaches, or the natural setting. You can help to make your stay, and that of others more pleasant by being tidy. Containers are provided for all refuse. Broken bottles are dangerous when left lying on the ground. A commendable practice is, "leave the site a little tidier than you found it".

Fires are ever a problem and a hazard in a woodland park. Fireplace grilles are provided for your convenience, and also for your protection, as well as others. A fire that has been reduced to "DEAD OUT" can neither harm anyone, nor this beautiful Park.

Bath houses are provided on bathing beaches for those who come to swim. They must be used for dressing and undressing.

All rules and regulations in force, are based on a respect for the rights of yourself and all others.

Park Rangers are here to help you; you can help them by following the rules.

Suggestions or constructive criticisms are always welcome. We too can learn.

Clare E. Mapledoram
Minister.

F.A. MacDougall,
Deputy Minister.

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ONTARIO

DEPARTMENT
OF
LANDS AND FORESTS

Division of Parks

WELCOME TO:

R O N D E A U P R O V I N C I A L P A R K

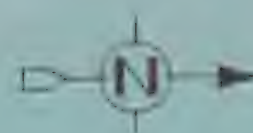
Rondeau Park is a beautiful area in which has been preserved about 2000 acres of the finest hardwood forest types in Southern Ontario.

Many of the trees and plants growing in the Park are rarely found farther inland. Rondeau also embraces about 2000 acres of marshland. The combined area offers a habitat which attracts many species of birds and small mammals. A sizable deer herd thrives in the Park.

Sand beaches provide water recreational activities par excellence. There is opportunity for the angler to indulge in this favoured sport.

To "YOU", the visitor

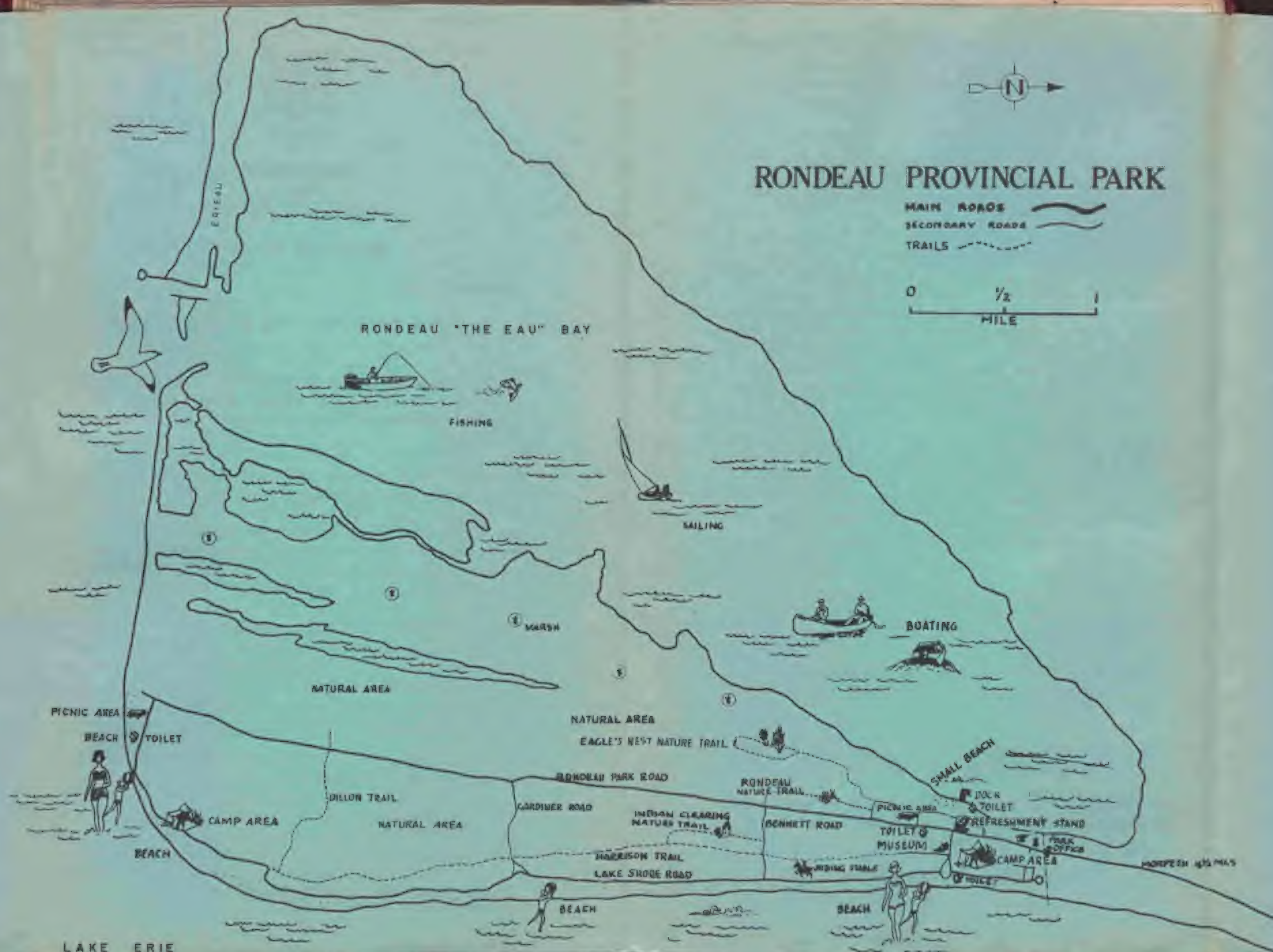
This unique Park is maintained for your enjoyment by the Ontario Department of Lands and Forests. The woodlands, the beaches, the camp and picnic areas, the museum and nature trails, the buildings and facilities are maintained for your convenience and recreation. We ask that you care for them as though they were your own.



RONDEAU PROVINCIAL PARK

MAIN ROADS 
SECONDARY ROADS 
TRAILS 

0 $\frac{1}{2}$ 1
MILE



LAKE ERIE



ONTARIO

DEPARTMENT
OF
LANDS AND FORESTS

Division of Parks

WELCOME TO:

RONDEAU PROVINCIAL

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Ontario

171

a series of pastures ~~showing~~ showing various stages in succession from grass to Crataegus thicket.

Near Eagle a different sort of tobacco is common, called "brightleaf", with taller bushier habit, and smaller, greener leaves. This common here but not seen much elsewhere.

Near St. Thomas country is more intensively cultivated with less woods, but with prominent hedgerows. East of St. Thomas considerable grain.

The country near St. Thomas becomes more rolling and not perfectly flat as it is farther west. Orchard dropped out completely.

Eastward the land is rolling, some woods. From Tillsonburg to Simcoe one of the principal crops is "brightleaf" tobacco. There are many woodlots and groves, some pastures. The tobacco is just starting to be harvested. The leaves are picked off, leaving the stalks standing.

In from beach Ulmus, Ostrya, Fagus, Acer rubrum, Acer nigrum var. become common. Rhus toxicodendron and R. canadensis common in ground cover. Maianthemum occasional, here under hardwoods.

A form of Asclepias tuberosus with very small cyms and pale orange flowers common in clearings back of beach.

In central part of park in deep forest is an elm about 100' tall, 2 ft. + diam. above buttresses. Buttresses very wide, about 6 ft. high. Dense ground cover of Boehmeria, Collinsonia, Onoclea. Area low, swampy, with beech-maple forest. Nearby a Populus deltoides well over 100 ft. tall and over 3 ft. dbh. Most trees in area ~~to~~ have slight development of buttresses.

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172

1958

New York Virginia

Sept. 4 - ~~between~~ just
north of Arkville, Catskill Mts.

39630

Echinochloa crusgalli var. *frumentacea* (Pers.) Wright
cultivated as a field crop

Catskill Mts. are well
wooded with hardwoods
with a liberal admixture
of *Pinus strobus* and
Thuja canadensis, some
Thuja plicata but this
might be planted. Near
the tops of some high
peaks and ridges
are slides or steeper slopes
more or less bare of
vegetation or only sparsely
vegetated.

Sept. 13 - Sleepy Hollow, 1 mi.
south of Falls Church, Fairfax Co. Va.

In mixed pine and hardwood
second-growth forest on gently sloping

31 *Ulmus ~~pumila~~ parvifolia* Jacq.
rare

32 *Ulmus procera* Salisb.
rare

Ulster Co. Fairfax, 173

culms erect, panicle
compact, purple and green.

young ^{saplings} ~~tree~~ up to 1.5 - 2 m. tall.

small tree 4 m. tall, with
deeply fissured very
corky bark.

Oct. 17 - photo of mixed hardwood forest with maize field in front west of Marshall.

photo of mixed hardwood on hill s. of Markham. Yellow Pinodendron, red cornus, quercus, still green. Another, similar. Det. Markham and Front Royal

photos of hardwood forest east side of Skyline Drive at about m.p. 7. same from Rattlesnake Point Overlook - showing Pinodendron.

From Front Royal to about m.p. 9 Lascapras rather abundant in most places along drive. Large areas of a very uniform low forest on ridges and gentle slopes - reddish brown in color.

Some steeper ridges and west facing slopes have a similar red-brown forest - probably *Q. montana* and *Q. rubra* or *velutina* - photos from Buck Hollow Overlook to north, across Thornton Gap.

Bet. m.p. 35-36 a fine area of uniform oak forest - *Q. rubra* - *velutina*? orange brown. Photos from Pinnacles Picnic Ground, also one of Crataegus. Pinnacles Ground entrance.

Two photos north at Big Meadows one showing Hawksbill, other "

clump of *Betula populifolia*.

Eaton Hollow Overlook 2500' - photos n.e. over Eaton Hollow - cool hardwood, largely Pinodendron, oak in some areas, a small admixture of pine, especially with oaks.

At first overlook north of Black Rock Gap, looking east, in valley is what appears to be a mixture of pine and *Nyssa*.

Bet. m.p. 90 and 91, on east side, below are good mixed pine and oak forests.

Just north of Ripshap Overlook is an area of *Quercus ilicifolia* mixed with pine and small hardwood. Not very striking. Better developed patch of *Q. ilicifolia* just below overlook. (1910).

At Sawmill Run Overlook is an excellent example of *Quercus ilicifolia* scrub with abundant emergent pines.

From Calf Mt. Overlook can be seen numerous small hills emerging abruptly from floor of Shenandoah Valley. Erosion remnants?

Coloring at higher altitudes just past its prime, excellent at middle alt. not quite at best on lower slopes.

Betula populifolia along road 2 mi. s. of Big Meadows

176

Collected
by me

1958 Virginia

Oct. 17 - Rip Rap Overlook, Skyline
Drive, Augusta Co.on roadside, edge of scrub
~~also~~ *Quercus ilicifolia* scrub.39633 *Aster pilosus* var. *platyphyllus*
rare2 34 *Amaranthus albus* L.
rare2 35 *Cyperus filiculmis* Vahl
common2 36 *Salix*
rare in edge of scrubOct. 18 - Blue Ridge Parkway at
Mile Post 9, south of Humpback Lake,
Augusta Co.

weedy road embankment

3 37 *Hedysotis purpurea* var.
with nos. 39638 and 39639 m2 38 *Hedysotis purpurea* var.
with nos. 39637 and 39637 m3 39 *Hedysotis purpurea* var.
with nos. 39637 and 39638 mOct. 18 5 mi. n.e. Lexington, 3 mi. e. of
Rockbridge Baths, on a ridge
east of Maury River, Rockbridge Co.
in steep ravine cut in limestone4 40 *Thuja occidentalis* L.
common in small area in thin woods4 41 *Oxypholis rigidior* (L.) C. & R.
common in shallow soil in thin woods

Shenandoah Nat. Park 177

2910'

890m

(7.9) Blake?

Jumps of
branches from a mowed
plant, old stem stiff.
rays white, disk turning reddish.
diffusely branched,
main stem erect, branches
ascending.culms spreading to ascending,
in small tufts.shrub 1.5 m. tall, leaves
glaucous beneath.representing a very polymorphic
population - in small dense
tufts.

same

same

crooked tree 25 cm. diam.,
with branches almost to base.
fruit smooth, not ribbed
dorsally when fresh.

Oct. 17 - Blue Ridge Parkway →

In first mile ericaceous understory to be seen locally.

Shenandoah Valley View (2355'). Magnificent hardwood forest here and on hills below, very mixed in composition. coloring now at its height - *Rhododendron* and *Carya* yellow, *Quercus* *pinus* greenish trees. *Cornus* red, *Quercus* *rubra* red or still green, *Robinson* green turning yellow, *Fraxinus* purplish yellow, etc. This extends in very good development at least to Humpback Rocks. No ericaceous understory at all here.

About m.p. 7 in a valley to the west is a striking area of solid pine, probably an old field. Below this is a high dam, evidently not ordinarily filled with water - probably flood control only.

At m.p. 9 photos in hardwood forest. Just south of here a patch of *Rhododendron* understory, but this is generally lacking in this area. Rocks in this area are mostly greenstone. Excellent *Polypodium*, etc.

20-minute Cliffs Overlook - steep slopes have mainly chestnut-oak forest, with scattering of other oaks, and pines, in places with understory of *Quercus ilicifolia*. *Pinus pungens* on rocks around overlook.

In valley below cave forest with *Liriodendron*, *Pinus strobus*, *Fraxinus*, etc. Cultivated and abandoned fields in valley and on hills opposite. Colors about perfect. Rocks covered by *Umbilicaria* and other lichens.

From here south, ~~South of here~~ the rock changes to shale. Ericaceous understory generally present. Forest has low stature. Trees have more nearly lost their leaves. Alt. 3000' +

From m.p. 25 to 30 many farms and pastures, country generally disturbed. M.p. 30-35, *Tsuga* becomes common, some *Pinus strobus* and other pines in hardwood forest. Ericaceous understory absent or poorly developed. m.p. 35-42 low altitude, 2100-2400'. *Pinus strobus* mixed in hardwood, no Ericaceae to amount to anything. South of here for several miles

good hardwood forest, then a mile or two on crests with low forest and scrub. some *Quercus ilicifolia* and birch.

Canyon from m.p. 47 down to Buena Vista ~~the~~ has steep walls, largely covered by pine. A low understory of *Vaccinium*, etc. prominent.

North on U.S. 39 from Lexington - limestone ridge e. of Maury River with thin oak forest much *Juniperus*, some *Pinus virginiana* and a stand of *Thuja occidentalis* in a steep ravine - s. of Rockbridge Baths, n. of Lexington.

West Virginia - road from Marlinton to Elkins, near Flat Fork hardwood forest, ~~acacia~~ ^{acer} ~~prominent~~ locally, some *Liriodendron*, much oak & birch. (3 photos 6 s. of Flat Fork, 2 e., ~~at~~ half with meter set at 100, other half one stop less light)

Tygert Valley - photo of *Acer nigrum* (2), also mixed forest.

The forest throughout this part of West Virginia is well colored, though many

leaves have fallen, browns very prominent, especially the oaks and birches.

Photo of hardwood forest in pass bet Elkins & Alpers. *Liriodendron* conspicuous.

Crumbling shale cliffs - Mouth of Seneca - *Geranium robertianum*, *Dryopteris marginata*, *Asplenium trichomanes*, *Hedysotis*.

Seneca Rocks - spectacular backbone of hard tilted rocks, continuation of ridge seen farther north. Still farther north along North Fork two walls of this same rock can be seen parallel in the hills (photos).

Photo of *Quercus alba* (purple-maroon) against a hillside of oak-birch forest, *Juniper* in front. (North Fork)

Northward, where road cuts through the hard dikes is a talus where *Pellaea*, *Woodia*?, *Draba*, etc. grow both in talus and crevices of hard fossiliferous limestone or limy sandstone. Is this Seneca formation?

14 mi. s. of Elkins Fork
Caverns

Smoke Hole Road - from north goes over high mountains covered with deciduous forest in full color. *Acer nigrum*, *Quercus* spp. etc. Ravines are dry or almost so. Whole aspect one of dryness.

Smoke Hole recreation area has flat bottom land with grass, hemlocks, pine, *Platanus*, etc. Steep walls with mixed hardwood forest with scattered pines on east wall, some hemlock. On west wall almost no conifers.

Fairly large stream.

Rich ground flora in hemlock grove on east wall - *Asarum*, *Polystichum*, *Dryopteris*, *Adiantum*, *Aster*, *Solidago*, *Carex* etc.

but no *Maianthemum* seen.

Small patch of *Asplenium* *rhizophyllum* on rock.

~~Results~~Oct. 19 - Mouth of Seneca,
Seneca Creek39642 *Dryopteris marginalis*
common1 43 *Hedyotis purpurea* var. *tenuifolia*
rare2 44 *Asplenium trichomanes*
commonOct. 19 - North Fork River, 1.4 mi.
s. of Smoke Hole Cavern.in crevices and talus
at foot of limestone cliff2 45 *Muhlenbergia*
common1 46 *Woodsia obtusa*
rare1 47 *Draba*
common1 48 *Pellaea*
rare~~1743~~Oct. 19 - Smoke Hole Recreation Area
Randlett Co.1 49 *Asplenium rhizophyllum* L.
small colony on rocks
in hemlock grove on steep,
west slope

glaucous

fronds procumbent, rooting
at tips

Oct. 11 - Washington, 18th + New Hampshire
Ave. weedy place along sidewalk.

59650

Panicum dichotomiflorum Michx.

culms spreading, depressed.

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